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July
2011

AUSTRALIAN

PERSONAL COMPUTER



Revolution

BETTER THAN MACBOOK AIR

Samsung's Series 9 is thinner and more powerful than Apple's supermodel



SMARTPHONES

ANDROID + WIN PHONE 7 + BLACKBERRY + iOS + SYMBIAN

KILLER PHONES FROM HTC, SAMSUNG, MOTOROLA, LG, NOKIA
SONY ERICSSON, HUAWEI AND MORE - REVIEWED AND RATED!

apc **FREE SOFTWARE** DVD
Vol 31 No 07 / JULY 2011
SOFTWARE / SECURITY / PLAYABLE GAME / LINUX



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THE ULTIMATE ALL-IN-ONE PHOTO AND
VIDEO ORGANISER - ALSO LETS YOU DO
BATCH RENAMING AND PROCESSING,
REMOVE DUPLICATES, AND MUCH MORE!

FULL
VERSION
\$40

TWEAKNOW POWERPACK 2011 SPI

Adds an easy tweaking front-end to 100 critical
Windows settings - so you don't screw up!

LATEST PUPPY LINUX

Puppy Linux runs on low-end
hardware or off USB sticks

FULL GAME RED ECLIPSE

A single and multi-player first person shooter



DEMO

**STARPOINT
GEMINI**
Play a level of
this RPG tactical sim!



In the Labs

ADVANCED MONITORS

MVA, 3D, S-IPS -
Displays are
getting complicated!



Upgrades

UPGRADING TO SANDY BRIDGE

Stick the new Intel
CPUs in your PC



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- + Build a gaming PC
- + Recover Windows passwords
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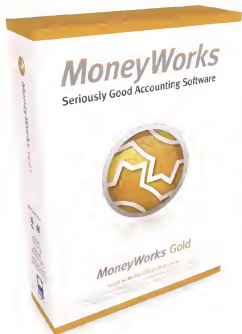
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KILLER PHONES FROM HTS, SAMSUNG, MOTOROLA, LG, NOKIA, SONY ERICSSON, HUAWEI AND MORE - REVIEWED AND RATED!

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MVA, 3D, S-IPS - Displays are getting complicated.



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on the dvd

BONUS SOFTWARE FOR APC READERS



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STARPOINT GEMINI

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editorial

TONY SARNO



MICROSOFT HAS NOTHING TO MATCH APPLE'S MIGHT. REALLY? I MUST BE IN A DIFFERENT UNIVERSE

I've been through one dot.com bust and I'm starting to smell another. Market valuations are getting distorted, and companies who have become the darlings of media and analysts are benefiting. There's obvious ones, like LinkedIn that cleverly cashed in on the infatuation for social networking sites with its IPO last month. It was worth a ridiculous US\$8.9 billion at the end of the first day's trading. A less obvious but still crazy market cap is Apple's. Is Apple really worth US\$315 billion compared to Microsoft's US\$205.1 billion. Apple is worth nearly as much as the entire annual GDP of Greece (\$330 billion) because the market believes the future belongs more to Apple than Microsoft. Market analysts and countless pundits and bloggers say Microsoft has nothing to match Apple's might and is not driving the shift to cloud computing like Google. Really? I must be living in a different universe. Fact 1: Just like it fixed Vista, Microsoft is onto the smartphone/tablet thing. Windows 8 is being built for tablets as well

as desktops and will integrate seamlessly with Win Phone 8. This smartphone/tablet/desktop ecosystem is going to be up against iOS/Mac OS X and Android and Chrome and my bet is it will steamroll them as Windows XP/7 Starter did Linux on netbooks. Fact 2: While everyone raves about Google's cloud apps, the Windows Azure cloud platform gives Window developers a way onto the cloud with the same skillsets. Expect an avalanche of cloud apps. Fact 3: Microsoft's partnership with Nokia will give it the world's best hardware for its mobile OS. Fact 4: The purchase of Skype potentially turns Microsoft into the world's biggest digital phone company. Fact 5: Traditional they may be, but Microsoft's Windows and Office cash cows are not going away anytime soon nor is Redmond's dominance in business and the enterprise. You can't write off a company with as much cash as Microsoft. In the past you would have been certified had you predicted Apple's success now.

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At VIPRE's core is an antivirus and antispysware engine that merges the detection of all types of malware into a single efficient and powerful system. The new technology was developed exclusively by GFI, without building on older generation antivirus engines. VIPRE uses next-generation technologies making it the future of antivirus programs.

Advanced anti-rootkit technology

VIPRE's all-new anti-rootkit technology finds and disables malicious hidden processes, threats, modules, services, files, Alternative Data Streams (ADS), or registry keys on a user's system.

Removing rootkits is supplemented by VIPRE's FirstScan which runs at the system's boot time. FirstScan bypasses the Windows operating system, to directly scan certain locations of the hard drive for malware, removing infections where found.

Real-time monitoring with Active Protection

VIPRE's Active Protection delivers real time monitoring and protection against known and unknown malware threats. Active Protection works inside the Windows kernel (the core of the operating system), watching for malware and stopping it before it has a chance to execute on a user's system.

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Bytesize

Mini news



WII SUCCESSOR

Nintendo has announced a successor to the Wii games console. The new machine is due for release next year, and further details will be announced at the E3 Expo, which takes place in Los Angeles from 7 - 9 June. A playable model of the console will also be on display at the show.

ARMY APP STORE

The US Army will soon have its own app store, featuring training manuals and productivity tools. The Army Marketplace is due to launch in August. It will be hosted on a US defence department server, and will be accessible only by the defence department community.

GOOGLE CAN'T HAVE IT ALL

US judge has ruled against Google's plans to create the world's biggest online library after complaints from authors. Only samples of works still in copyright would be accessible, but some authors objected, saying they hadn't given permission for their works to be scanned.

Billed as an iPad competitor, the Eee Pad looks to be quite a contender.



HOT PRODUCT

ASUS's response to the iPad: Eee Pad Transformer

The creator of the netbook strikes back with the Eee Pad, offering the best of both worlds.

Can't decide between a tablet and a notebook? ASUS is offering you a shape-shifting Honeycomb hybrid, which is keenly priced too. The Eee Pad Transformer went on sale last month in Australia, and it's set to garner its fair share of local attention after making a bit of a splash overseas.

On the face of it, a quick glance at the Transformer's specs indicates a capable Android tablet. It runs the tablet-tailored Android 3.0 Honeycomb OS on a 10.1in 1,280 x 800 display, powered by Nvidia's Tegra 2 processor and shipping with 1GB RAM. It's a reasonably slim 12.98mm thick and light 680 grams. With other features such as dual cameras (1.2/5MP) the base 16GB model for \$599 isn't a bad buy. 3G connectivity is the only significant omission (but we're told such a version is on its way).

But the killer feature of the device isn't any of the above. Spend \$200 more for the 32GB model and ASUS throws in the Eee Station keyboard dock, which effectively turns the Transformer from a tablet into a notebook. It's a 254mm chiclet-style keyboard (the same size as found on a 10in netbook), giving you pretty much full keyboard functionality for more productivity-focused applications (such as using the included Polaris office suite software).

The keyboard dock includes a multi-touch touchpad, SD card reader and two USB 2.0 ports. Plus, it packs its own 8-hour battery, which all up gives you a handy 16-hour (plus) battery life. If you don't want to opt for the 32GB version up front, we're told the keyboard dock will be available separately for around \$150, but we're inclined to think the 32GB model is probably the better deal anyway. Be aware that the dock when attached adds significantly to the weight of the device.

The Eee Pad Transformer is the first time we've seen an Android tablet with such a comprehensive docking solution, and at \$799 it's certainly a tempting proposition for those users who like their keyboard/mouse input.

Peter Dockrill

The docking station increases usability and battery life.



TOP 10 ...TECHNOLOGY TRENDS IN THE SECOND HALF OF 2011

1 TABLETS MARCH CONTINUES

There's no ease up in the numbers of iPad challengers on the way.

2 SMARTPHONE APPS

Apps are starting to take advantage of sensors in phones, ie GPS (for shopping), proximity (micro payments), etc.

3 PHONE PAYMENTS

Google and vendors launching phone payment systems. Banks worried, getting into it too.

4 ANDROID GOES BALLISTIC

Phones using Google's phone OS now easily outselling iPhones globally.

5 CONSUMER CLOUD HARDWARE

Google is about to launch its dumb-terminal but easy-to-care-for Chromebooks.

6 PERSONAL DEVICES AT WORK

Personal smartphones and tablets are being accepted into corporate networks.

7 INTERNET TVS

In essence, TVs are on the way to becoming giant tablet computers.

8 THIN RULES

The MacBook Air set the trend. Check out Samsung's Series 9.

9 FACEBOOK MARKETING

Marketing to Facebook "fans," is now obligatory for most businesses.

10 GESTURE RECOGNITION

It started with Wii, but Microsoft will integrate into everything else.

With better specs and a lower price only time will tell if the Dell can shake Apple out of its tree?

Dell latest to take on Apple MacBooks

Can Dell's new XPS 15z slay the MacBook Pro, ask **Conrad Bem**.

Dell doesn't say as much, but its new aluminium-clad XPS 15z all-rounder is a stealthy attempt to snuff Apple's MacBook Pro. Until this machine, Apple was the only company that offered a deluxe all-rounder notebook with a base covered entirely in aluminium. Now, the Dell XPS 15z (U510502AU) also comes sheathed in its schmick anodized aluminium case. The Dell doesn't have a unibody like the Apple, but nonetheless its build quality is very high.

Neither notebook is what you'd call a true ultraportable, but both can still be carried around without any significant difficulty. The Apple is slightly heavier than the Dell by a mere 20 grams but it's also thinner by about half a millimetre. The weight difference in particular is impressive considering the Dell's larger screen and consequently larger depth and width.

Both machines have similar processors (the Mac a Sandy Bridge Intel Core i7-2630QM and the Dell a Sandy Bridge Intel Core i7-2620M) but the remainder of the specs are solidly in the 15z's favour. It has an NVIDIA GeForce GT 525M that's significantly more powerful than the MBP's AMD Radeon HD 6490M. An intensive game like StarCraft 2 will easily run at high settings on the Dell, while medium settings are the best the MacBook Pro will manage.

The MacBook Pro has a fairly standard 4GB of RAM, but the 15z offers a colossal 8GB. The Mac's 15.4in (1,440 x 900 resolution) display is superb, but the Dell offers a 15.6in display and manages to cram in a Full HD resolution of 1,920 x 1,080. Storage-wise, the MacBook Pro sports a 500GB (5,400rpm) hard disk drive, but the 15z trumps it with a larger, faster 750GB hard disk drive at 7,200rpm.

When it comes to ports, the MacBook Pro offers high data transfer rates with its Thunderbolt and FireWire 800 ports, plus offers two USB 2.0 ports and an SDXC card slot. But for sheer variety, the 15z wins the connectivity comparison hands down. It has an HDMI port, Mini DisplayPort, RJ45 port, a pair of USB 3.0 ports, a USB 2.0/eSATA port, Gigabit Ethernet and a 9-in-1 media card reader. It also has Bluetooth 3.0, compared to the MBP's Bluetooth 2.1.

If there is any real doubt left in your mind by this point (there isn't in ours), the Dell's \$400-cheaper asking price seals the deal very clearly in favour of the 15z: it's more affordable, has almost universally better specs, looks just as good (Apple no longer has the unequivocal lead on presentation that it once did) and offers great build quality.

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APPLE IPADS SOLD IN 2011

THE (A)PC REVOLUTION JULY / 1994

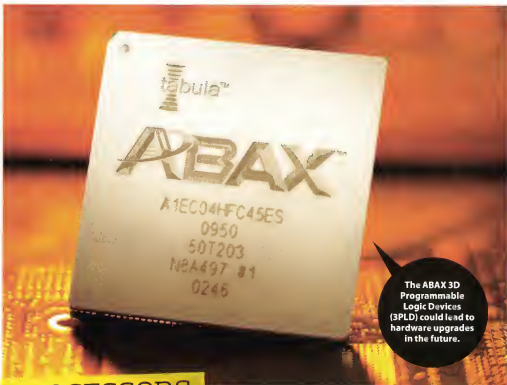


LOOKING SMART

SunMicrosystems has entered the mobile workstation market with a machine that addresses some of the most talked-about concerns of the 90s. Housing a 60MHz microSparc II CPU, the Voyager is also equipped with 16-bit audio, 16MB memory, a 340MB hard drive, I/O interfaces, and twisted pair Ethernet, ISDN, SCSI-2 parallel and serial ports. Prices start at around \$21,000.

LEO PREDATOR

No PC system can compete with the optimum power and performance of Intel's Pentium processor combined with Intel's PCI Local Bus in the Leo Predator System. Taking full advantage of the PCI bus, the system comes with advanced PCI VGA and SCSI controllers. With up to 96MB RAM, up to 256KB cache, and 525 MB SCSI HDD, a 3.5" 1.44MB FDD, 3 x 32-bit PCI slots and 4 x 16-bit ISA slots, it outperforms all others in its class. Utilising the most advanced components in the industry, the Leo Predator System allows you to take complete command of even the most demanding applications.



The ABAX 3D Programmable Logic Devices (3PLD) could lead to hardware upgrades in the future.

PROCESSORS

REPROGRAMMABLE CHIPS TEASE HARDWARE UPGRADES

Investors pump \$108 million into new CPU wizardry from Tabula that could extend hardware shelf life

You probably won't have heard of Tabula. It's not Intel, AMD or ARM, but this tech startup has quietly revolutionised processor design. That's why investors have been keen to pump \$108 million into the company, betting big that Tabula's tech is a game-changer.

Tabula's ABAX family of 3D Programmable Logic Devices (3PLD) represent a new category of general-purpose chips. For starters, they're designed to be reprogrammable. On its own, this is nothing new. A Field-Programmable Gate Array (FPGA) already offers the same benefit, enabling companies to update the functionality of products after shipping.

According to Tabula, the problem with FPGAs is that they are often expensive, have a large footprint and can't be used in mass production quantities.

ABAX chips also use a 3D 'Spacetime' architecture, which mimics a processor with multiple stacked layers. So instead of adding

extra circuitry, Tabula's approach is to reuse the same circuitry at different times to perform different functions.

Tabula's CTO Steve Teig explained it this way: "Imagine you walked into the elevator in a building and then walked out, and I rearranged the furniture while you were in there. You would have absolutely no way to tell you weren't on a different floor."

The 3PLD chips do a similar trick, switching between eight configurations at up to 1.6 billion times per second. That's roughly one million times faster than a competing FPGA.

The technology could let manufacturers update hardware as easily as a software product can be patched or upgraded today. Consequently, the shelf-life of computing and consumer electronics devices could be extended; technical errors could potentially be addressed and corrected without expensive product recalls. Intel. Sandy Bridge. Need we say more?



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ASUS Eee Pad Transformer

The world is going tablet crazy at the moment, and the Eee Pad Transformer is the latest to cross the gadget desk here at APC. It's a 10.1in Wi-Fi super-slim (12.98mm) tablet that is available in either 16GB or 32GB options. Powered by an NVIDIA Tegra 2 dual-core processor it offers snappy performance which is what you're after when browsing the web and multi-tasking. The IPS panel is made from scratch-resistant glass so it's safe in the bottom of your backpack. There are front and back facing HD cameras, but our favourite part is the optional full-size QWERTY keyboard docking station which includes two USB slots, an SD card reader and can extend the battery life up to 16 hours.

CONTACT ASUS ONLINE WWW.ASUS.COM.AU

PRICE 16GB \$599 / 32GB \$799 with dock.



Hitachi Touro Mobile Pro

Sometimes USB keys just aren't big enough. At other times external drives aren't up to the rough and tumble of daily transport. Well, we've found a solution in the Hitachi Touro Mobile Pro portable drives. Available in 500GB and 750GB sizes, they're USB 3.0, 7,500rpm drives. We have the 500GB version, and its sleek design isn't out of place with the rest of our gadgets. Hitachi also offers 3GB of cloud backup, so if you use the drive as a backup, not just a portable device, you'll be doubly protected.

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Contour+ camera

What? You still use your hands to hold your camera? How old school. The Contour+ is a 1080p hands free camera that you can strap to wherever you want and get filming. It has a wide 170-degree field of view and can stream the footage live via an external transmitter. It has Bluetooth so you can use your phone as a viewfinder and also adjust camera settings. There's a 2.5mm microphone jack too, so you can capture your screams as you hurtle down a hill on your mountain bike, watch out for those trees.

CONTACT CONTOUR ONLINE WWW.CONTOURAUSTRALIA.COM.AU
PRICE \$699



Acer P3251 projector

When the biggest screen TV just isn't quite big enough, the next logical step is to invest in a projector. The P3251 can project up to a maximum distance of 11.9m so unless you live in a McMansion it will be fine for your lounge room. You do need to make sure you have a surface that's 5 x 5 metres if you want to display the images at full size though. Acer's EcoProjection technology cuts standby power usage to just a single watt, and the lamp is rated at up to 5000 hours in economy mode. There is an HDMI port and multi-channel audio, along with an SD card slot. Weighing in at only 1.2kg and coming packed in its own carry bag, you'll be able to take it along to the next family slide night with ease.

CONTACT ACER ONLINE WWW.ACER.COM.AU PRICE \$1,999

Logitech Wireless Solar Keyboard K750

Wireless peripherals will always be appealing because they eliminate long tangle-prone cables, but they have a problem; batteries inevitably run out when it's least convenient. Enter the Logitech Wireless Solar Keyboard K750. It has a pair of large solar panels that keep it running even in normal indoor lighting, and there's a test button to press that shows if there's enough light. It's a little heavier than you'd expect, but it's nonetheless very slender and feels solidly built. It's super glossy and the full-sized chiclet keyboard is exceedingly pleasant to use.

CONTACT LOGITECH ONLINE WWW.LOGITECH.COM.AU PRICE \$149.95

Nexus Silent Mouse

If you don't like broadcasting to the office that you're clicking through online photo albums instead of doing your work, you should consider a mouse with a little less squeak to it. The Nexus Silent Mouse with its 'Patented Silent Switch Technology' is wireless and can be used with either your PC at work, or your notebook at home for bedtime clicking without waking your better half.

CONTACT MINI-BOX.COM.AU
ONLINE WWW.MINI-BOX.COM.AU
PRICE \$30



LIFE IN THE NBN'S WORLD

So what exactly can the NBN do for ordinary Australians? **David Braue** gives a rundown.

Ask Rod Tucker what he'd like to do with the high speeds and ubiquitous connectivity offered by the national broadband network (NBN), and he's full of ideas. Of course, that's his job: as director of the Institute for a Broadband Enabled Society (IBES) think-tank at the University of Melbourne, Professor Tucker and his team of thinkers are eagerly working to substantiate the use cases for the country's biggest infrastructure project.

He's not alone: in recent months, a slew of initiatives have been announced to explore potential uses for the network. NSW's Australian Centre for Broadband Innovation (ACBI), for example, is backed by NICTA and the CSIRO and is exploring e-health, education, government and infrastructure projects. The NSW government's NBN Taskforce unites government and private-sector research institutions.

A live 100Mb/s NBN testbed has been established in the new Parkbridge housing estate in western Sydney. And a \$4m telehealth trial will explore ways of linking doctors and patients via video in the Armidale and Kiama early-release NBN sites.

From one side of the country to the other, small groups of interested private-sector

and government bodies are coming together to explore the potential uses for the network – and to see whether the average Australian would pay for them. The one application that definitely meets those tests, Tucker says, is entertainment – one that the government has tried to steer away from because it is perceived as too frivolous to justify a \$36 billion spend.

Scorn from the Opposition recently led Tony Abbott to refer to the NBN as 'Building the Entertainment Revolution' in a veiled reference to Labor's oft-maligned education programs. But there is great commercial potential in providing fast pipes that will allow nearly every Australian household to get pay-TV content – expanding the reach of Foxtel and rivals well past the 30% or so of households currently able to access cable services.

"There is no one killer application for the NBN," says Tucker. "The killer application is all the applications. Entertainment is a great part of our social infrastructure; we already spend a large amount of [government] money on the ABC, for example. But there has been a reluctance to talk about it. I don't see anything unpleasant about the idea that the NBN will provide entertainment."

Whether or not you agree, the NBN's



Smart meters will enable us to connect with our home appliances from the outside world.

value as a pay-TV network is only one of many ways NBN access will change your life. Here are 10 reasons we agree with:

1. TELEHEALTH

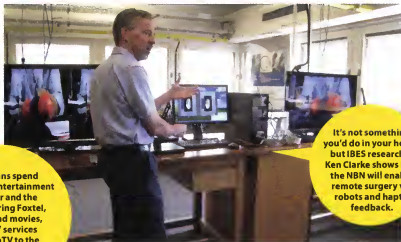
You may not need it now, but you could some day – or know someone who will. Some health services already let nurses check in on patients in their homes using existing phone lines, performance is sketchy and functionality limited. Nurses and doctors will use the NBN to conduct natural video consults with remote patients, monitor life-sustaining medical equipment in patients' homes, and run live therapy and exercise sessions with rural patients who will no longer have to travel hundreds of kilometres to capital-city specialists.

2. REMOTE LEARNING

Many schools have fibre connections, but sharing them among 1,000 or more users means glacial-speed internet that often leaves teachers struggling to access online resources – and then giving up. The NBN will speed overall school performance and let students participate in faraway classes using interactive whiteboarding and videoconferencing from their homes. This may sound like a luxury in city areas,



Australians spend billions on entertainment each year and the NBN will bring Foxtel, on-demand movies, and IPTV services like FetchTV to the 70% of homes that can't get pay TV.



It's not something you'd do in your home, but IBES researcher Ken Clarke shows how the NBN will enable remote surgery via robots and haptic feedback.



One IBES project puts coloured 'orbs' into the classroom as an avatar for sick students. There's no telling how sending a coloured ball to work in your place would go over with your boss, though.

Low latency, high-quality video bandwidth will let patients and therapists communicate. A pressure-sensitive device lets stroke victims convey strength and movement in this IBES trial.



Faster upload speeds will enable a two-way Internet — and the many things that become possible when you've got it.

but in rural areas - where small schools can't offer many essential classes because they don't have enough students to justify a teacher - virtual classes will link students across large geographical distances and make otherwise unviable classes possible.

3. VIDEOCONFERENCING

Naysayers inevitably like to talk about how well Skype offers video over the internet, and for free. But quality and bandwidth varies online, and those depending too heavily on Skype are often disappointed. On the NBN, increased bandwidth and guaranteed quality of service will ensure a better-quality result all round - whether you're using Skype or videoconferencing as part of other services. This opens up tremendous possibilities: communicate with loved ones; learn a new language with a native speaker; conduct corporate board meetings without the cost and bother of travelling to a central location.

4. GAMING

If you're into online gaming, you already know how bad ping times can affect your performance. It may seem like a frivolous application for the NBN, but around 1 million Australian households are signed up to the PlayStation Network alone. With gaming a multi-billion-dollar market, improved ping times, speed and reliability will give your gaming a new lease of life. Ditto in-game voice and video chats, which the NBN will handle without flinching.

5. SMART HOMES

They won't be here overnight, but smart meters - those much-discussed, expensive boxes that will track your energy usage

in real time - will also be permanent links to the outside world. Remote-controlled dishwashers and off-peak washing machines are too far-fetched to care about, but how about logging into your home's security system to watch your dog while you're interstate, review video of the guy who just made off with your jewellery, or just turn off the lights and iron you left on in the rush out the door? The NBN's ubiquitous connectivity will make these sorts of uses commonplace and easy.

6. WORKING FROM HOME

It may be tricky if you're a bricklayer by trade, but people in more and more jobs are finding that adequate broadband helps them take their work home with them - and participate in team meetings via videoconferencing as if they were at the office. Whether you're staying home to look after a sick child who's stayed back from school, or just can't be bothered getting out of your PJs, the NBN will let you be at work even when you can't be at work.

7. MEDIA & ENTERTAINMENT

So we already know that IPTV will bring services like Foxtel and FetchTV to all Australians, but that's not the end of the entertainment-related bonanza the network will deliver. Say goodbye to video stores: on-demand movie services will let you stream HD movies to your TV in real time. Use better upload speeds to push content to your smartphone in high quality. Hosted music services will stream and play any song, anywhere. Play massively multiplayer online games hosted on remote servers. Share videos with family and friends without having to wait hours while they upload. Bandwidth will, simply, no longer be an obstacle.

8. FASTER TWO-WAY INTERNET

The NBN, of course, will make your internet services more reliable and, in most cases, faster than what you are already using. This not only improves your internet experience significantly, but lets you bring more services into your home at the same time. Equally important are increased upload speeds: there's no point having fast download speeds if the people at the other end can't send you data quickly. The NBN will raise the bar and improve the online experience for everyone.

9. INTERACTIVE SHOPPING

Imagine standing in front of your computer, with a Microsoft Kinect-like camera on you and reading your movements to control an on-screen avatar. Adjust your avatar with your own real measurements, then take it to your favourite online store and try on different combinations of clothes to your heart's content. Online merchants may have a long way to go still, but - as Second Life showed so well - creating virtual worlds, and shopping in them, is more than possible when you have heaps and heaps of bandwidth.

10. REACH OUT & TOUCH SOMEONE

The NBN's low latency lets you interact with someone far away like they're in front of you, whether you're playing guitar with a mate or watching your grandchildren open the presents you sent them for their birthday. Researchers are adding new dimensions to these experiences by building 'haptic' systems that transmit touch and movement over the NBN. Squeeze a tactile controller, for example, and your physiotherapist on the other end of the session will feel your grip from far away. **ETC**



WHY TABLETS ARE KILLING NETBOOKS

Nobody saw it coming. The tablet has become a massive hit with consumers and **Jenna Pitcher** explains why it's hurting netbook sales.

Whether you're an iPad sceptic, like many geeks, or infatuated with it, like many consumers, we've reached a point where the balance of tablets and netbooks is beginning to tip in the favour of the tablets. This is happening both in sales and even hardware performance.

Microsoft's general manager of investor relations, Bill Koefoed drove it home when, in the last Microsoft earnings conference, he said there was "a 40% decline in netbooks" in the last quarter of 2010, which in turn had made the PC consumer market decline 8%. Other manufacturers have reported stagnation in netbook markets. Chipmaker Intel, whose Atom CPUs power most netbooks, has confirmed that sequential flat quarters in Atom processors sold to netbook markets was due to cannibalisation from tablets.

Craig Skinner, senior consultant at Melbourne-based analyst house Ovum, says:

"The netbook numbers have certainly been dropping off, and the obvious thing that's been eating that has been the tablet devices. I think that we certainly haven't seen it finish reducing yet. We're still at a very early stage of the tablet adoption. We still have quite a long way and a lot of growth there."

Skinner, however, believes that netbooks are here to stay as a niche market for those consumers who still want something highly portable but with a keyboard.

WHY THE TABLET POPULARITY?

So why are tablets so popular? Is it because the form factor appeals, or are they just an inevitable product of the organic evolution of personal computers?

Mark Pesce, a Sydney analyst and future forecaster says: "Nearly all of what we did with huge boxes 15 years ago can now be done on mobiles. Tablets sit comfortably in between the whale and the minnow. They'll

converge on the dimensions (and thickness) of a sheet of paper over time, as they grow increasingly pervasive and useful."

Skinner pointed out that it's important to look at the way consumers are using the competing technologies when it comes to producing and consuming content.

"When you're doing a lot of word editing or photo editing, drawing or working on a spreadsheet, you want to use a notebook or desktop to do that. With netbooks, if you want to do a lot of typing, your fingers are a bit cramped on the keyboard. But on the other side, with the consumption of media and content, the netbook isn't really designed for that either."

He said that's where tablets had come into their own. The tablet technology is ideal for a bit of typing, social networking and reading. The tablet really focuses on that different, specialist role, whereas the netbook tries to do a bit of everything and doesn't do one thing exceptionally well.



IF A TASK DOESN'T NEED A KEYBOARD, THEN IT'S PERFECT FOR A TABLET

"The intuitive ease of use of the tablet weighs in too," says Skinner. "Netbooks are a watered-down PC platform that still runs standard software, which can often frustrate consumers. On the other hand, tablets are based on smartphones, so they have simpler operating systems and apps are developed specifically for the devices and their multi-touchscreens. The end result on a tablet is a lot more efficient and takes advantage of the features of the device."

FORM FACTOR

The single form factor of the tablet (that is, no attachments like keyboards or screens) is perfect for many uses, such as having the tablet on your lap to watch TV or movies.

Pesce says: "It's all about interfaces. How often do you need a keyboard? That drives the notebook/PC. For everything else, it's a tablet or a mobile." Perhaps, in one sentence, Pesce neatly sums up the devastating power of the tablet: If a computing task doesn't need extended use of a keyboard, then it's perfect for a tablet. It means that we probably haven't even scratched the surface of what could migrate to tablets.

Skinner says the attraction of not having to open up the lid to use a tablet made it ideal to use on a train, plane, crowded environment or as a student in a university lecture. "The fact that it's sort of a single surface that you're working with is quite an important part of that ease of use," Skinner says. "It doesn't take up much space on your desk or on your lap. You can sort of hold it up to your face and you don't have to rest it on something."

And as for the missing keyboard, if more typing is required, then a Bluetooth or USB keyboard can be attached — and suddenly you have a hybrid device. You can then tuck the keyboard away to use when it's needed later.

COMPLIMENTARY DEVICES

Another trend that goes hand in hand with the explosion in tablets is the increased adoption of the cloud by consumers. Cloud clients, such as Google's email service, Gmail, and Dropbox for document and file hosting, have helped make tablets much more functional than originally expected.

"You have all the documents you use from different devices and you don't need to be thinking about it. You're at home working on

the notebook, you're working on the document," Skinner said. "You head off on the train, or on a trip or something, you just take your tablet with you and you still have all your documents and everything with you."

FORECASTS

Ovum analysts forecast that tablets are here to stay: global shipments of portable devices based on a "lite" OS will hit 150 million per year by 2015, from 2.8 million in 2010. Up to 35% of global shipments in 2015 will be in our backyard, in the Asia-Pacific region.

"We believe that Apple constituted 90% of the market in 2010. However, by 2015 we expect this market share to drop to 35% and Google's market share to rise to 36%. Other software platforms, such as RIM's BlackBerry Tablet OS and HP's webOS, will find some success but between them all they will only account for 29% of the market," said Tony Cripps, Ovum's principal analyst.

It remains to be seen if the predictions will meet their forecasts, but all indications now are that tablets are likely to take over computing where a keyboard is not essential. And that's a big slice of what we do. [GIGAOM](#)





Camera manufacturers are being forced to think creatively.

Sony's Xperia Play aims to capitalise on the popularity of gaming on smartphones.



HOW SMARTPHONES DRIVE INNOVATION

Modern phones can do almost anything, so specialist devices need to offer something new.

With smartphones becoming ever more sophisticated and multi-purpose, manufacturers of single-purpose devices are finding that they must innovate or face a difficult future. This is something Cisco Systems acted on in its recent decision to end production of the Flip line of compact video recorders, just two years after purchasing the brand for \$590 million.

Jordan Selburn, consumer electronics lead analyst at IHS iSuppli, identified the problem faced by companies like Cisco: "Consumers are becoming less interested in buying devices focused uniquely on taking videos when this capability is increasingly available in other electronics systems already in the consumer's pocket, such as a smartphone or personal media player." In the 24 months since Cisco purchased the Flip line, smartphones have gone from taking basic VGA video to recording 720p HD footage as standard, with some even managing 1080p. The remaining video recorders are now being pushed to innovate ahead of smartphones, which is exactly what Sony's doing with its Bloggie 3D video device.

END OF THE ROAD

It's not only video camera manufacturers

that face increased competition from smartphones. Phones with large screens and GPS chips can replace sat nav devices (though some sat nav manufacturers are trying to make the most of this), and the statistics for photo uploads on services like Flickr are now dominated by devices like the iPhone 4.

Even Nintendo, which has experienced huge growth in the last few years, is now starting to see its market share eaten into by gaming on Android and iOS devices. Flurry Analytics reports that Nintendo's share of the

dedicated cameras can fill a need that most smartphones can't, like waterproofing or 3D imaging. Even the basics can be improved, as Canon told us: "Dedicated cameras have larger sensors, which give them better image quality in challenging lighting conditions. Even the build and form can be a benefit on dedicated cameras. Buttons are in the right places, and menus are easy to navigate for photography purposes."

Nintendo has now launched the 3DS, which offers stereoscopic 3D gaming without glasses to set it apart from the competition from smartphones. While 3D screens are set to be included in phones like the LG Optimus 3D, there's no guarantee games and apps will use it. Both the 3DS and Sony's next handheld console, the NGP, use physical analogue controls –

something touchscreen phones can't match.

E-reader devices like the Kindle set themselves apart from smartphones and tablets with use of an E Ink screen, which gives them a battery life of several weeks, compared to mere hours on a phone. As long as manufacturers can offer that kind of distinct advantage in a standalone device beyond what smartphones can manage, there will always be users who will agree that 'good enough' isn't necessarily good enough.

Be sure to check out our roundup of the latest smartphones on the market on page 28

IT'S NOT ONLY VIDEO CAMERAS THAT FACE INCREASED COMPETITION FROM SMARTPHONES

portable gaming revenue fell from 70% in 2009 to 57% in 2010, with the difference going entirely to mobile gaming on Apple and Google's mobile operating systems. This point is hammered home by Sony's decision to discontinue the PSP Go handheld console and launch the Xperia Play phone, complete with the PlayStation Pocket gaming portal.

However some hardware manufacturers, including Sony, are confident they can offer a superior experience to smartphones with a single use device. While a phone camera might be good enough for many people,

THE SMARTPHONE OF THE FUTURE

A test bed for new technology.

HAPTIC FEEDBACK

This has been around in the form of vibrations for a while, but Intel has developed a prototype device that can actually change its shape and feel using software. Your phone could tell you how many emails you have or indicate directions simply by how it feels to the touch.

LONGER-LIFE BATTERIES

With large screens and dual-core CPUs now appearing in many new phones, battery technology has had to improve significantly and will continue to do so. Apple recently filed for a patent covering batteries that are denser, can charge faster and hold their charge better over time than current ones.

MULTICORE PROCESSORS

The ARM processors that power new smartphones are becoming incredibly quick, but remain extremely power efficient. The pace of development has led to one of the biggest announcements from Microsoft about Windows 8: it will be able to run on the ARM platform. This could be big news for manufacturers of tablets and notebooks.

AUGMENTED REALITY LAYERS

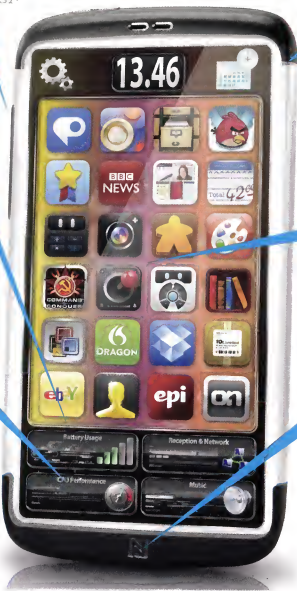
This is currently available on phones using the built-in cameras, but now transparent displays are being produced commercially by Samsung, it's possible that future phones could become transparent, save for information about whatever you're looking at.

HIGH-RESOLUTION SCREENS

Apple's Retina Display on the iPhone 4 features a resolution of 640 x 960 at an incredible 326ppi. The resolution and colour accuracy of the IPS screen make photos look incredible, despite the device's relative thinness. Hopefully, camera manufacturers will begin to include similar technology.

NFC

This wireless communication tech (near-field communication) allows for contactless payment, but can potentially transfer much more data, so you could receive your receipt in digital form in the same tap you use to make the payment. It could also read information from special tags located in magazines or posters.



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IVY BRIDGE

10 YEARS OF INTEL RESEARCH LEADS TO WORLD'S FIRST 3D TRANSISTORS

Intel's revolutionary new 22nm transistor and Ivy Bridge CPU are breaking huge ground in performance and power efficiency for devices ranging from smartphones through to servers. **Peter Dockrill** and **Conrad Bem** report.

With so much innovation and development in the mobile computing industry in recent years, particularly with regard to the smartphone and tablet categories, the demand for high-performance and low-power processors is greater than it has ever been. But Intel's game-changing new Ivy Bridge processors don't just stop at the portable end of the computing spectrum. Indeed, Ivy Bridge processors will be making their first appearance this year in the server space, before being rolled out across what Intel calls the rest of the "Compute Continuum" (desktops, notebooks, netbooks, tablets, smartphones, smart TVs and embedded devices) over the next two years.

The Ivy Bridge CPU involves Intel's new "Tri-Gate" 22nm transistor technology, which uses less power, while boosting performance, by doing away with the two-dimensional design of planar transistors and introducing a more efficient 3D transistor model.

Technically speaking, Ivy Bridge offers two major improvements. First, the feature size has been reduced to 22 from 32 nanometres. Feature size simply means the minimum allowable distance between transistors and other features on a silicon chip. Any denser

and they interfere with each other in such a way that the processor won't work properly. This means that in Ivy Bridge processors there can be more transistors, and any instruction given to these transistors will be carried out more quickly. Faster clock speeds are the most obvious result.

Far more important however is the new 3D Tri-Gate transistor technology. Normally in a transistor a gate sits on a layer of an oxide that sits on a layer of silicon. Electric current is passed through the silicon and an inversion layer forms that allows the gate to function. This isn't entirely efficient, however, because the silicon layer degrades the amount of incoming electric current.

In contrast, Intel's 3D Tri-Gate transistor has a raised fin of silicon rather than a flat layer. This raised fin has a thin oxide coating and is essentially buried in the gate rather than underneath it. As before, electric current passes through the silicon and forms an inversion layer that allows the gate to function. The improvement results from there now being three surfaces in contact with the gate rather than just one.

There is almost no degradation of the incoming electric current, so it is delivered more efficiently and reduces the amount needed for a gate to operate. One immediate

improvement is battery life, because not only is there less electric current being lost but the processor goes from idle to active and back again much more quickly. When you remember that these improved transistors are now packed much more densely, it's clear why the performance boost in Ivy Bridge is going to be so dramatic. Indeed, Intel claims the leap to 3D is "fueling" the continuation of Moore's Law (as Tri-Gate is only costing 2-3% more than conventional planar transistors), and that, without the new 3D design, the trend would not be able to be sustained.

In any case, Intel's figures released recently indicate we'll be seeing some pretty remarkable benefits with Ivy Bridge-based devices: at low voltage, active power use is reduced by more than 50%, while offering a 37% performance increase (compared to 32nm planar transistors). Effectively, at the portable end of the spectrum, smartphones and tablets will be delivering significantly better performance (while sucking significantly less power), and at the other end of the scope, servers in data centres will provide markedly improved energy efficiency. If there was any doubt over whether Intel was holding off from making a play for the lead in the low-power (mobile) CPU space, Ivy Bridge is a ground-breaking clarification. [ETL2](#)



Clockwise from top: Joseph Glanville, 19; Sheng Yeo, 22; Alex Sharp, 20.

THE PRODUCT IS GETTING TRACTION IN THE MARKET AND IS WEEKS AWAY FROM BREAKING EVEN.

TAKING ON THE AMAZONS

Three Aussie university students have created a cloud storage startup service to take on Amazon, reports **Mahesh Sharma**

You can never accuse Sheng Yeo, Alex Sharp and Joseph Glanville of not thinking big. Really big. In 2009 the trio was separately dabbling with a number of software development and system administration projects on top of their studies at the University of Technology, Sydney.

Sharp and Glanville planned to develop a search engine that produced more relevant results than Google by allowing users to rank results. The first challenge was that developing a system that 'learned' from user responses required a huge amount of computing and database processing power. The second, even bigger challenge was that it would put them in direct competition with Google. Meanwhile, Yeo worked on his own radio engineering project, which also needed a large amount of computing power.

The paths of the three students intersected when they soon realised they all needed cheap, readily-available high-performance computing and storage power to drive their ambitious projects. But when they attempted to build their projects using Amazon's cloud product, EC2, they found it didn't suit their needs.

A quick Google search showed a lack of readily available, reliable high-performance computing, which meant there was actually a

huge market for these services. They decided to attack this fledgling market, and OrionVM was born.

As the summer of December 2009 rolled around the boys worked tirelessly over the holidays to develop a prototype. They even quit their jobs and went into debt to buy the required servers, processors and hardware. The hard work has resulted in a beta version launched in April 2011. Yeo, now the OrionVM CEO, says third-party testing shows OrionVM beats competitors in key areas of benchmarking for high-performance processing and storage.

He says what makes the custom-built OrionVM platform special is that it uses a distributed storage system which uses high-speed connections (40Gb/s) to spread the load between servers. This means as the load increases there is more redundancy built-in to ensure speed is unaffected. By comparison, competitors use a centralised storage array, which creates a bottle-neck as the load increases, because more servers are required to boost resources.

The product is getting traction in the market and the time of writing OrionVM was weeks away from breaking even.

However, the boys haven't done it alone and regularly turn to the start-up

community for help and advice. This includes consulting with Alan Perkins, chief information officer at electronics manufacturing software developer Altium. Perkins was first introduced to the trio by Sydney start-up scene mover-and-shaker Bart Jellema, who heard the boys were looking for some help around the branding and product positioning.

The first meeting between Mr Perkins and OrionVM was intense. Perkins says: "I asked them some pointed questions, trick questions. I wanted to see how much they were focused on the technology versus the sense of how they can change the world. Their response was very much on what I thought would be the right things, rather than not just the geeky aspect."

The boys are convinced they can build a world-leading technology. Yeo says: "We're out to prove the doubters wrong. If we wanted to make a whole heap of money, there's a lot easier platforms we could've built say in the social scene like a group buying platform. It's more for ourselves, being able to say we started something ourselves when everyone said we couldn't. We took that through from nothing to a point where it's successful. That's the biggest driver." **STREET**

NATIONAL BROADBAND ELEPHANT

Why build the NBN if we're going wireless?

In reference to David Braue's story on the NBN (May) I can't help but wonder whether the NBN is sending Australia down the wrong path. You just have to look at where the centre of gravity in computing is shifting to these days: wireless communications, wireless apps and mobile devices such as smartphones and tablets. This is where the world is going, where software development is at its

most exciting and where the bulk of the world's population (already in South East Asia and Africa) will be doing most of its computing and consuming most of its content.

3G and now 4G networks and Wi-Fi are the future and where Australia has a fantastic opportunity to be among the leaders in innovating and creating software for these technologies. Yet, we seem to

be throwing in our lot with a big fat pipe that's more likely to become another avenue for watching more freeview HDTV or having video conferences with aunty Gertrude in Bendigo, instead of putting Australia at the forefront of global mobile computing and communications development.

Big computer vendors who've missed the mobile internet boat are already getting hammered in

the market, yet here is Australia blissfully doing the same. As one writer aptly put it on the APC facebook page, "We're building a massive train network when everybody now wants to drive cars." The NBN has the potential to a catastrophe for this country, both in terms of the obscene cost and for potentially turning us into a computing sideshow.

Paul Williams
from the Web

NBN CABLE ISSUE

I'd like to highlight a serious issue with David Braue's article "Get your home ready for the NBN" on page 14 of your May 2011 edition. David made the following two comments:

"Unless you or a mate are adept at running cables behind walls, however, you'll probably want to wait until you're doing renovations to your home in the next few years and your walls are open."

And also (in reference to powerline network adaptors): "They're particularly great for renters, for whom the thought of physically running network cable may invoke nightmares involving rental bonds and angry landlords..."

The problem is that in Australia, you can face fines and even a criminal conviction for running your own network

cables, along with causing serious harm or damage to people and property.

In a nutshell, if it's fixed or concealed (ie. permanent) and is capable of being connected to a telecommunications network now or in the future, it requires an appropriately registered cabler to install it.

That also means it's illegal to run pre-terminated cables through holes in the wall or floor. This is defined under the Australian Standard AS ACIF S009:2006 and regulated by the Australian Communications and Media Authority (ACMA).

Like qualified plumbers and electricians, registered cablers have undergone training to ensure that they comprehensively understand the various potential hazards when running cables. From electrocution through mains

power or lightning conductors through to gas explosions and even trip hazards. Readers only have to think back to the foil insulation disaster last year to get an idea of the risks.

ACMA have a useful fact sheet on cabling (bit.ly/jpV46P) that should help APC readers avoid becoming the next Darwin Award recipients.

Carl Wilson
Geebung, QLD

PS: It's also important to note that not all electricians are registered cablers.

PLAYBOOK

What was RIM thinking when it released the PlayBook without BlackBerry email? Seriously, do these folks do any market research before spending billions of dollars releasing new products to market?

I picked up my PlayBook in the US and it's definitely the best 7in tablet out there, so I agree with the reviewer in the June magazine, but I disagree with him on the tablet being "misunderstood."

By whom?

The only people who misunderstood the PlayBook were RIM management. When I showed the PlayBook to my BlackBerry-using friends, they were all immediately excited to see one, then immediately disappointed when told it does not come with native BlackBerry email.

Are you listening Mike Lazaridis (RIM's co-CEO)? You should have realised by now that people buy your devices for the email, so releasing a BlackBerry tablet without native email is insanity. I don't want to have to tether the thing to my BlackBerry





Technically you don't need them, but they are darn sexy to look at.



DESIRABLE GADGETS

One reader doesn't agree with our reworked gadgets spread.

I am an old time reader of *APC*, and I must comment on the new gadgets pages up the front of the magazine (page 12 June). For me it's just another example of how the tech industry is convincing people that they need more technology than they actually need. It's a bit like plasmas. They were a luxury a few years ago, now even the most destitute families would rather put a plasma in the lounge room than

food on the table. Looking at the products you featured, I am now being told I must have an eBook reader to read books even though people have been reading books without eBook readers since Gutenberg. As for the phone, my current top-of-the-range HTC I bought last week is clearly not good enough anymore, since you advise that the HTC Incredible S is even better. But that's last month's magazine,

and there's bound to be yet another new HTC phone as you read this now. As for the Panasonic HDC-HS900, I am sure that is a good videocamera, but with all that Full HD video I will need to invest in a bigger NAS. And a HD projector at home. Somehow, I think all these new gadgets are making life harder.

Robert Wilson
Hobart, Tasmania

MELANIE PIKE'S ANSWER: The section actually isn't new we've just moved it from the back to the front of the magazine. It's not designed to shame your current personal tech, just highlight upcoming products that we think are desirable and worth a mention for those who are looking to upgrade.

every time I want to access BlackBerry email on it.

Let me send you a message from the frontline, Mike. Unless you fix this pretty quickly (all it needs is a software update) the PlayBook may go down alongside the Apple Newtown as one of the greatest products never to make it.

Jason Robinson
from the web

HOT AIR

We all know that hot air rises, so why do companies make CPU fans fight against natural

convection and blow downwards?

Gordon Drennan
Burton SA 5110

NICK RACE'S ANSWER: It's a pressure issue. The fans can easily pull in air from the middle of the case, but might move less air if they need to suck it up through the heatsink's fins.

COPYING FOXTEL WITHOUT IQ

I've read your May issue and note on page 79, re Copying Foxtel, that you imply that unless you have Foxtel IQ you cannot tune

Foxtel automatically to line up your program with your programmed DVD hard drive (or maybe a PVR) in advance. You CAN set your regular Foxtel box to tune in automatically, without paying for IQ.

Even some of the tech help people at Foxtel don't seem to know about this.

Using the remote:

- 1 Press "TV Guide" button
- 2 Scroll and use the "Select" button to select your area of interest e.g. "Entertainment"
- 3 Scroll to channel e.g. "Lifestyle"

4 Scroll to program of choice e.g. "Antiques Roadshow", select it using Select button, it then comes up in the "Planner" view

5 Press the "red" on your remote and it will auto tune your Foxtel to your selected program!

If you make a mistake, just press the "yellow" button to delete that program.

(You cannot watch a different channel to the one you are recording, or you'll be recording that one instead)

J. Burns
from the web

EPINIONS@APCTEST.COM

Come on, have your say!

We want to hear what you think. Add to these discussions or email your views (in fewer than 250 words) to epinions@apctest.com. All correspondence becomes the property of APC and is subject to editing. Letters must include full name, street address, suburb, state and phone number to be considered for print publication. Address and phone details will not be published.



The big paper trail fail

An APC reader asks why in this electronic age, companies still send out information on paper.

Tim Meredith, from Carlton, Victoria says he's never particularly liked the End User column, since "it mostly mocks end users whereas it could have been a forum for actually trying to understand them."

In line with his stance on End User, Meredith has decided to submit "a sort of reverse End User." In other words the "victim" to whom he shows neither sympathy nor understanding is the IT profession, since he argues that IT pros should take a stronger role in forcing companies to abandon still rampant and expensive use of paper when they communicate with their customers

Meredith says he's been taking extended trips out of Australia for a few years and after the last one he decided to seriously try to reduce the amount of paper mail that accumulates while he's away.

"The range of mail waiting for me on my return from overseas included information and requests for donations from charities, bank statements, insurance renewals, mail from

companies in which I hold shares as well as from the ASX itself and of course one or two magazine subscriptions including one to APC. No personal mail to speak of because, I'm pleased to say, that comes via email or other electronic communication. Of course some mail can only be in paper such as magazine subscriptions – if you only subscribe to the paper version.

decision not to send mail electronically. "One was a club whose manager believes that paper creates a better impression for the members," he says. "Unfortunately, but at least you know where you stand. In the middle are the organisations that send only some of their communications electronically. Most of these were financial or quasi-financial organisations.

the sense of Federal or State laws do not prevent it but would actually facilitate sending this mail electronically. Ultimately my credit union advised that it was not the law but their industry body that had not approved sending this information electronically. I suspect my insurance company is in a similar position though interestingly if I ask they will send me an

THEY WILL SEND ME AN ELECTRONIC VERSION, IN ADDITION TO THE PAPER VERSION

electronic version of my annual renewal and policy documents, in

But much other mail I thought could or should come electronically."

Meredith was surprised that the organisations that agreed to his request to send all of their communications to him electronically were the charities, like Amnesty, Unesco and Oxfam. "They responded to my requests within a few days at most and implemented the change by what would have been the next mail out. I now receive no mail in paper from them and can be up-to-date anywhere in the world." But Meredith also found others had taken a deliberate

"One was a managed investment fund. Lest you think this might be something specific to the sector, a competing fund sends all mail electronically. I solved that problem by putting the funds elsewhere.

"My credit union has this mixed approach. They do a lot of their business electronically but they still send mail such as changes to fees – quite generic mail – in paper. On questioning they initially they told me the law prevents these being sent electronically but my own investigations through APRA and ASIC suggested that 'the law' in

addition to the paper version."

Meredith is convinced that within these organisations there is not the know-how, will or expertise to implement technological change. He therefore gives a fail to the IT profession. "It is clearly not getting new methods of information delivery accepted into and by organisations."

But he's not finished. "Apart from resigning myself to more years of paper mail, I give a Big Fail to APC. Yes, APC's renewal notices cannot be sent electronically! That's really dumb." **BTB**

ENDUSER@APCTEST.COM

Share the hilarity!

Do you work in the IT industry and are forced to deal with inept and clueless end users on a daily basis? If you have an interesting or amusing story, email us at enduser@apctest.com. All correspondence becomes the property of APC and is subject to editing. Letters must include writer's full name, street address, suburb, state and phone number to be considered for print publication. Address and phone details will not be published.



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The **HUAWEI IDEOS XS** smartphone combines an impressive array of features at an affordable price.

Featuring a 3.8in WVGA TFT capacitive touch screen and a SMP AF camera and flash, the **HUAWEI IDEOS XS** records and plays HD video and incorporates an inbuilt music player with SRS Audio enhancement.

The **HUAWEI IDEOS XS** uses the Android 2.2 operating system and is loaded with an 800MHz CPU, a high speed USB 2.0 port and 2GB of internal memory.

HSDPA and WLAN Wi-Fi connectivity options help you connect easily to the internet while taking advantage of Bluetooth 2.1 and A-GPS functionality. You can also enjoy the wide range of apps that the Android Market has to offer.

The **HUAWEI IDEOS XS** retails for \$349 at Crazy Johns and Dick Smith, and is available for \$0 on a \$29 cap from Crazy Johns, or as part of the Crazy Johns \$49 combo deal that includes two handsets.



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EDITOR

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SMARTTEST SMARTPHONES

Trawling through a sea of smartphones to find the one that suits you is a mammoth task. **Jenneth Orantia** looks at the good, the bad and what's new.

Last year we witnessed some of the biggest changes in the history of smartphones.

Apple threw down the formidable iPhone 4 with its game-changing hardware and impressive new features; almost a year later, it still serves as the benchmark for other smartphones.

Android flooded the market with an army of devices that penetrated every price point and, for the first time, made smartphones as cheap as feature phones. This also had the domino effect of bringing down prices across the board, and all of a sudden premium smartphones couldn't get away with demanding four-figure prices any more.

Finally, having learnt their lesson from Apple, Symbian, Microsoft and BlackBerry each launched new versions of their mobile operating systems that targeted consumers and made the user experience a number one priority.

Another shift that saw smartphone adoption go through the roof in Australia was the active promotion from carriers. The runaway success of the iPhone had carriers trying to replicate this success with other smartphones, and exclusive sales agreements on particular models – especially for the mid-range and premium phones – became a common technique for drawing in new customers.

The cost of 3G data also plummeted to an all-time low, and both prepaid and postpaid subscribers reaped the rewards of data allowances that were suddenly measured in gigabytes rather than megabytes.

These developments have set the scene for what's shaping up to be an even bigger year than last. Lucky for us, most of the activity is taking place right now, as all of the major players are rushing their hero devices to the market in case they're ambushed by a new iPhone mid-year.

The biggest breakthroughs have come in the form of hardware improvements. Smartphones with dual-core

processors from Qualcomm, NVIDIA and Samsung have only just started to go on sale, and our tests using the Quadrant benchmark have demonstrated that these perform significantly better than their single-core stablemates. The clear front-runner for performance is the Samsung Galaxy S II, which uses the latest 1.2GHz dual-core Exynos processor. The benchmarks speak for themselves: its Quadrant score of 3,131 was not only twice as good as the fastest single-core smartphone (the Sony Ericsson Xperia Play), but it also beat the other dual-core smartphones by a comfortable margin.

UNDER REVIEW



Apple iPhone 4



BlackBerry Torch 9600



BlackBerry Torch 9800



HTC HD7



HTC Incredible S



Huawei Ideos X5



iNO Cloud Touch



LG Optimus 2x



Motorola Atrix



Nokia C7



Nokia E7



Nokia N8



Samsung Galaxy S II



Samsung Omnia 7



Sony Ericsson XPERA Arc



Sony Ericsson XPERIA Play

Display technologies have also matured at a breakneck pace. After Apple unveiled the iPhone 4's superb Retina Display with in-plane switching last year, it became an arms race between the other big players to see who could build a better screen. AMOLED (active-matrix organic light-emitting diode) displays became the weapon of choice, and it also soon became the default screen type for premium smartphones like the HTC Desire, Samsung Galaxy S and Nokia N8.

As the world's largest producer of AMOLED displays, this put Samsung in a great position to capitalise on its resources, and it acted accordingly by producing enhanced versions of the AMOLED technology: Super AMOLED displays in the original Galaxy S and Omnia 7, and a new Super AMOLED Pro display in the Galaxy S II.

A worldwide shortage of AMOLED displays mid-last year had HTC switching to Super LCD, and the jury's still out as to whether it's an improvement over Super AMOLED. Still, there's no questioning its superiority over standard LCD displays. This shortage didn't prevent Nokia (only the world's largest manufacturer of mobile phones) from securing a batch of AMOLED displays for its latest flagship phones, and the C7 and E7 join the N8 in boasting lovely AMOLED panels. Nokia has tweaked the screen on the E7 even further by adding its proprietary Clear Black Display technology, which reduces reflections on the screen and enhances black levels and contrast.

Not to be left out of this smartphone screen one-upmanship, the Motorola Atrix brings something new to the table: a quarter HD (960 x 540) display that officially makes it the highest-resolution smartphone after the iPhone 4, whose screen resolution is only slightly higher at 960 x 640. But the Atrix doesn't quite

achieve that hallowed 'Retina Display' status. This is where the iPhone's smaller 3.5in display works in its favour; since there's less room for the pixels to spread out (compared to the Atrix's larger 4in screen), the pixel density on the iPhone 4 is a lot higher. Still, it's a step in the right direction, and we're expecting to see more qHD displays to come to market later in the year.

As if larger, better and higher-resolution screens weren't enough to keep the punters happy, another trend that's taken off this year is the inclusion of HDMI. This is a feature that's fast becoming standard on premium smartphones, and out of the 16 smartphones we reviewed for this feature, six of them support HDMI output. This includes the Apple iPhone 4, which can now output HD video using the optional Apple Digital AV Adapter.

If that seems like cheating, it's worth pointing out that none of the smartphones we reviewed have full-sized HDMI ports built-in, which means all of them require an adapter of sorts to connect to an HDTV. Nor is that adapter necessarily included. As well as the Apple iPhone 4, which requires the \$45 digital AV adapter to add HDMI connectivity, the Nokia C7 and LG Optimus 2x don't come with the requisite cable in the box. What's worse, there's no standard size for this connector across smartphones, which means you can't swap adapters between handsets.

With all this innovation happening on the hardware front, it's easy to forget about the software behind the scenes. Thankfully, none of the platforms have been sitting idle, and all of the mobile OSs have seen small yet significant improvements.

Google has finally released its Gingerbread update, taking Android to version 2.3, and the key features including a new software keyboard, tweaks to the

UI and better memory and power management.

Microsoft issued its first Windows Phone 7 'NoDo' update in March, adding copy and paste functionality and improvements across performance, app search and Wi-Fi. Still to come, though, is the first major update for Windows Phone 7, code-named 'Mango', and this is expected to add multi-tasking, Internet Explorer 9 and Twitter integration.

Rather than improve on its existing (and fairly new) BlackBerry 6 OS, RIM has steamrolled ahead with a completely new BlackBerry 7 OS. Bad news for existing BlackBerry users: this won't be available as a software update, as most of the improvements rely on more firepower than what's included on current models. Instead, it will be shipping natively with the new BlackBerry Bold 9900, with new features including an enhanced web browser, revamped UI, support for NFC technology, HD video capture and playback, and a new BlackBerry Balance feature.

Apple has been throwing out software updates left, right and centre, and while the UI still looks more or less like it did on the original iPhone (we're hoping iOS 5 will finally give the iPhone some new graphics), every successive update adds a boatload of new capabilities. Now at OS 4.3.3, some of the more noteworthy additions include Game Center, AirPlay, AirPrint and Personal Hotspot.

On the Symbian side of the fence, a new 'Anna' update adds a new browser, portrait QWERTY keyboard and real-time homescreen scrolling. This new version will be shipping natively with the yet-to-be-released Nokia X7 and E6, however Nokia has indicated on its official blog that this will be rolled out to older Symbian^3 devices (namely the N8, E7 and C7) in the next few months.

What do I look for?

in a smartphone...

PURPOSE & PRICE

Consider whether you want the phone for business, home or both. Weigh up the features of a selection of phones within your price range. Try them out if you can.

OS & UI

What's your preferred OS? Apple iOS, Android, Symbian, Windows, BlackBerry... Familiarity may be a consideration for you — you may be unwilling to learn a new system. Usability also matters.

SIZE

Size matters. You may want all the bells and whistles of a larger phone, or be willing to compromise.

MEDIA

Can you email, watch movies and take photos? Oh, and make calls? Will the battery last?

KEYBOARD & SCREEN

Do you want a QWERTY keyboard or a touchscreen keypad? What's the screen resolution? Can you read clearly on it? Does it reflect in sunlight?



-  9.3MM THICK
-  APPLE A4 PROCESSOR
-  3.5IN 960 X 640 DISPLAY



FROM \$859

8/10

Apple iPhone 4

First to market, but the others are catching up.

www.apple.com/au

-  Backside-illuminated camera; high-res Retina Display, pentaband 3G antenna.
-  No microSD expansion, web browser doesn't support Flash, fragile casing

When it comes to singing the iPhone 4's praises, we scarcely know where to begin. The delightfully intuitive UI that has everyone from children to grandmothers picking it up is probably a good place to start, along with the ridiculously large selection of apps and games (350,000 at last count) available in the iTunes store.

On the hardware side, the 3.5in display may be smaller than the screens on other smartphones in its price range, but it makes up for this shortcoming with its razor-sharp 960 x 640 Retina Display and ultra-responsive capacitive touchscreen. This is encased in an exquisitely crafted glass and stainless steel enclosure that prioritises looks over practicality – the glass is likely to shatter if you drop it any further than a foot onto a hard surface.

A few weeks before we went to print, Apple finally released the white version of the iPhone 4, which is identical to the existing black model and available in the same 16GB and 32GB capacities.

The rigorous app approval process and closed OS – not to mention the lack of choice in handsets – means the iPhone isn't as favoured by power users, but this lack of fragmentation also means software updates come directly (and frequently) from Apple. Apple hasn't been shy about updating and improving the OS, adding new features like multi-tasking, wireless internet tethering, AirPlay and the free 'Find my iPhone' service in the latest software updates.

Still, with newer smartphones like the Motorola Atrix and Samsung Galaxy S II boasting larger screens, faster processors and more features, the 10-month-old iPhone 4 is starting to feel its age. Apple needs to release a new model this year to stay competitive, lest it be outclassed and outnumbered by superior smartphones.

-  SPACIOUS KEYBOARD
-  10.5MM SLIM
-  NEW 1.26GHZ PROCESSOR





\$0 ON PLAN

9/10

BlackBerry Bold 9900

Sexy retro BlackBerry.

www.rim.com.au

-  Great keyboard, touch-screen; slim and fast
-  Evolution rather than revolution.

If the new BlackBerry Bold 9900 had four wheels, it would be a retro car, like a Chrysler PT Cruiser or a new Volkswagen Beetle – a way for RIM to sneak modern technologies into a body shell that looks nostalgically like the much-loved Bold 9000 from 2008. While RIM has more contemporary styled touchscreen devices, such as the Storm and the Torch, with the 9900 it's looking after the traditionalists, those who still use a BlackBerry primarily to get their secure email and who need to work with Office documents.

So RIM has improved the QWERTY keyboard, touch-enabled the screen and improved its resolution, made the processor more powerful, added a new sexier interface with new iconography, introduced a new faster OS (BlackBerry OS 7) upped the video recording resolution to 720p HD and made the Bold 9900 the slimmest Berry yet at 10.5mm.

In other words, the Bold 9900 might look superficially like the old 9000, but every part is improved. Most of all, I liked the 9900's keyboard. It's quite simply the best and most spacious Berry keyboard yet. I found myself having to adjust to the more spacious keypad – a nice problem to have. The Bold 9900's 2.8in screen is now fully touch-enabled, making the navigation experience more contemporary and easier. The resolution of 640 x 480 at 287 DPI makes for a crisp display on which to view your Office documents. By the way, the Premium version of the mobile office suite, Documents to Go, now comes free as standard on the 9900.

The Bold 9900 actually comes in two models, the 9900 and 9930 – they are same phone, only difference being that the 9900 supports Tri-band HSPA+ while the 9300 does CDMA/EV-DO.

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-  **4GB INTERNAL STORAGE**
-  **SLIDE-OUT QWERTY KEYBOARD**



\$869

6
10

BlackBerry Torch 9800

Upgraded, but not quite there yet.

 www.blackberry.com

-  Good battery life; well-designed QWERTY keyboard; gold-plated email system.
-  Performance is lacking; dated design, limited third-party apps and games

Fabulous QWERTY keyboards and corporate-friendly features; up until fairly recently, these two characteristics have kept BlackBerry at the top of the smartphone food chain. But now the iPhone and an army of Android devices have well and truly brought smartphones into the mainstream, RIM has had to reinvent the BlackBerry to suit a new generation of users who demand touchscreens, apps, social networking and multimedia in their mobile devices.

That said, the Torch 9800 isn't exactly the 'Extreme Makeover' version of previous BlackBerrys – it's more like a tentative baby step towards where RIM wants to be. At the very least, it's an improvement over the first touchscreen attempt, the BlackBerry Storm, as RIM has not only updated the OS to version 6, making it more touchscreen- and consumer-friendly, it's incorporated a slide-out QWERTY keyboard behind the Torch's 3.2in HVGA touchscreen.

Visually, OS 6 is close enough to previous versions that BlackBerry veterans will find it familiar, but there are numerous changes under the hood. The homescreen has been overhauled to show Android-style notifications on top of the screen, and apps are now grouped by categories. Icon-based menus have replaced many of the system menus, and there are new search, social networking and music apps, not to mention an overhauled WebKit browser.

As far as email, security and unified messaging goes, the Torch 9800 is still at the top of its game, but the antiquated 624MHz Marvell processor means it doesn't have enough power to pull off the rest of its features – we frequently encountered sluggishness when web browsing, navigating menus and launching apps – speaking of which, The BlackBerry App World store is below par.

-  **162G**
-  **1,230MAH BATTERY**
-  **4.3IN LCD**



\$768

7
10

HTC HD7

Easy to use, until the battery dies.

 www.telstra.com.au

-  Fast performance; large display; easy to use
-  Limited customisation options; multi-tasking not supported; short battery life.

HTC has positioned the HD7 as a mobile entertainment device. An edge-to-edge 4.3in 800 x 480 display sits front and centre, there's a stand on the back for propping up the HD7 in landscape format like a mini TV, and the Dolby Mobile SRS surround sound and 16GB of internal storage are further evidence to support HTC's claim.

But we wouldn't go so far as to recommend the HD7 to multimedia aficionados. While it's got that large screen, it's of the older LCD variety, placing it behind other smartphones that use the newer AMOLED, Super AMOLED and Super LCD display technologies. To add insult to injury, the screen's viewing angles are limited, making the integrated kickstand seem superfluous.

Dolby SRS surround sound looks good on paper, but the speaker's not very loud and it has the same tinny output most phones have. The Zune media player software works great for music playback, but you're out of luck when it comes to playing DivX and Xvid videos – it only supports WMV and H.264 MP4 files.

If you're not too fussed on the entertainment front, the HD7 offers a great user experience for corporate users and consumers. Windows Phone 7 has come a long way since previous versions of Microsoft's mobile OS, and the UI has been completely overhauled to banish layered menus in favour of a simple tile-based homescreen, large stylised fonts and apps you navigate through by swiping. Microsoft has taken a leaf out of Google's playbook by baking in support for some of its most popular products, including Office, Exchange, Xbox Live, Windows Live, Internet Explorer and Bing, and you can download more apps from the 10,000-strong Windows Marketplace. Battery life isn't up to scratch.



HTC Incredible S

A 'sweet as' smartphone.

www.optus.com.au

- ✓ Bundled 16GB microSD card; vibrant Super LCD screen; beautiful interface
- ✗ Average call quality; tiny loudspeaker; can't uninstall preloaded Optus apps

If we could have it our way, HTC would customise its smartphone names for every country, and models designated for Australia would have names like the HTC 'Fully Sick' and the HTC 'Sweet As, Bro'. As it turns out, the company has played it safe by using generic accolades that translate well across markets, hence the name of its latest Android smartphone, the HTC Incredible S.

Happily, its name isn't just puffed-up posturing, and while it's priced as a mid-range smartphone, its feature set is largely high end. We're yet to see HTC bring out a smartphone with a dual-core processor, so for now, the Incredible S is as good as it gets with 1GHz Qualcomm MSM8225 single-core processor, 768MB of RAM and Adreno 205 graphics. This puts it between the Sony Ericsson Arc and Play in the Quadrant benchmark, scoring a respectable 1,402.

The extra 256MB of RAM on top of the standard 512MB sees the phone performing like a champion, despite the fact HTC has customised almost every aspect of the Android 2.3.3 (Gingerbread) OS for the better. Beautifully designed widgets, animated wallpapers and themes, extra apps and lots of tweaks and tune-ups all amount to the best Android user experience we've encountered.

The matte black casing is understated, but the rest of its hardware grabs attention. The vibrant 4in WVGA Super LCD has colours popping off the screen, while the 8MP camera and dual-LED flash produce sharp images and surprisingly smooth 720p HD video. The usual four capacitive touch buttons adorn the front, but HTC has cleverly changed their orientation depending on how you're holding the phone. 1GB of internal storage is available, generously supplemented by a 16GB microSD card.



Huawei Ideos X5

Straight Android, amazing price.

www.crazyjohns.com.au

- ✓ Affordable, good performance; bundled 8GB microSD card.
- ✗ Mediocre call quality; no Wi-Fi out of the box; poor outdoor visibility.

As little as only six months ago, the Ideos X5 could've been part of the smartphone elite. But with the next generation of phones hitting the market, the X5's plainer features still make it a solid Android phone. Huawei has priced it accordingly, and the X5 offers amazing value for those looking for a solid, bargain priced smartphone.

The X5 isn't much to look at, but it isn't the plastic fantastic mess you'd expect of an entry-level handset, either. The soft-touch back and rounded edges make it a pleasure to hold, and the bright 3.8in 480 x 800 capacitive LCD is a definite upgrade over other screens in this price range. The four capacitive buttons on the front don't always light up when pressed or when the screen is active.

Huawei has equipped the X5 with an 800MHz Qualcomm MSM7230 processor with 512MB of RAM – a combo that, for the most part, has Android 2.2 purring like a kitten. It helps that Huawei isn't overloaded the X5 with any custom launchers, widgets or wallpapers to tax the processor. Oddly, Wi-Fi hotspot functionality (a feature of Android 2.2) isn't supported, but a Huawei rep confirmed that an upcoming software update would fix this. The X5 achieved a score of 1,378 in Quadrant, which is well above average for an entry-level Android and beats last-gen 1GHz smartphones like the Nexus One, Samsung Galaxy S and HTC Desire.

The underpowered speaker and limited viewing angles mean we wouldn't recommend the X5 as a multimedia player, which is a shame as it comes with a respectable 2GB of internal storage and a bundled 8GB microSD. Battery life is better than expected, easily lasting well over a day of use.



- ★ 600MHZ QUALCOMM T227 PROCESSOR
- ★ 3.5IN 480 X 320 DISPLAY
- ★ CUSTOM FACEBOOK WIDGETS

INQ Cloud Touch

One for the youth.

www.vodafone.com.au

- ✓ Lots of Facebook features; affordable; comes with a 4GB microSD card
- ✗ Poor viewing angles; mediocre performance; inferior 5MP camera.

If you're under 30 and consider Facebook a primary form of communication, you're INQ's target demographic. The little-known London-based company has been making Facebook-friendly phones for years, but this is the first time it's used Android.

The Cloud Touch runs a customised version of Android 2.2 that puts Facebook front and centre, with a news feed widget on the main homescreen, Facebook data synced to the calendar and contacts, and shortcuts to Facebook features like places, chat and photos.

While most of the Cloud Touch's Facebook functionality links through to the generic Facebook app (available for download to any Android phone), INQ has developed a separate People app that displays the profiles of your 'Top friends'. This hooks into Facebook's Social Graph API to determine the friends you look up most, although you can manually add contacts more.

All of the standard Android apps like Gmail, YouTube, Maps and Browser are on board, along with some extra goodies such as Windows Live Messenger, Shazam and Twitter. There are funky icons, a customisable application dock and a unique lockscreen you can unlock directly into the camera, homescreen or INQ Type app. A play/pause button on the lower right side launches the Music app in the background, and a handy information button on the top left provides a landing page of functions like Wi-Fi and battery status.

The Cloud Touch looks the part of a youth-oriented smartphone with its distinctive white plastic casing (also in red) and curvy edges. It has a 3.5in 480 x 320 touchscreen that's reasonably responsive. It came last in our benchmark tests (465 in Quadrant), 40 points behind last-gen Android devices like the HTC Desire.



- ★ 4IN WVGA IPS DISPLAY
- ★ 1GHZ DUAL-CORE TEGRA 2 PROCESSOR
- ★ HDMI MIRRORING



LG Optimus 2x

First to offer dual-core.

www.harveynorman.com.au

- ✓ Affordable price tag; strong performance; bright display.
- ✗ Lag issues; software instability, doesn't come with an HDMI cable

When we first got wind of the Optimus 2x in December, LG declared it the world's first dual-core smartphone, a claim that has since been confirmed by Guinness World Records. In practice though, it doesn't mean a whole lot given it's come out only a hairsbreadth ahead of the Motorola Atrix and the Samsung Galaxy S II.

More relevant is the bargain price. At \$649, it's Australia's cheapest dual-core smartphone by a comfortable margin. It has the same 1GHz NVIDIA Tegra 2 dual-core processor as the Motorola Atrix (but only half the RAM at 512MB), along with a vibrant 4in WVGA IPS display, 8GB of internal storage with microSD expansion, HDMI output and an 8MP camera that can record 1080p HD video.

The smaller RAM chip explains the Optimus 2x's benchmark score of 2,439 in Quadrant, which is 271 points slower than the Motorola Atrix. It might also account for the Optimus 2x's lag issues. While it's mostly quite snappy, and rightfully sits pride of place as the third-fastest smartphone in the Quadrant benchmark, we found it was frequently slow to respond to screen taps, and certain tasks like unlocking the phone, launching the camera app and activating the backlight were sluggish.

It's taller and slightly wider, but there's no mistaking the angular lines, steel-coloured band and positioning of the headphone jack, power button, speakers and microUSB port as derivative of the iPhone 4. Design elements such as the software keyboard, phone dialler, messaging app and shortcut dock also ape iOS.

The Optimus 2x takes (most of) the best parts of the iPhone 4 and improves on them with the flexibility of Android. Unfortunately, LG seems to have overlooked stability and speedy performance.

BenQ

The BenQ 27" Full HD LCD Monitor

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Ultimate 13 Connectivity + 4 USB Ports

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* HDMI 1.3 x 2

* S-Video x 1

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* Component x 1

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* Mini jack x 1

* RCA x 2

Audio out

* Headphone x 1

* Line-out x 1

* S/PDIF x 1

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Endorsed by World Cyber Game CounterStrike legends HeatoN and SpawN,
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BenQ

Enjoyment Matters



Motorola Atrix

The smart revolution has begun.

www.telstra.com.au

- ✓ Supports 5GHz 802.11n, snappy performance, unique companion accessories
- ✗ Runs Android 2.2; oddly positioned power button; no HDMI mirroring.

If you don't count unconfirmed and rumoured devices, the Atrix would be the one smartphone we've been looking forward to all year. It helped that Motorola announced it months before its release at CES. It's one of the few phones on the market that packs a dual-core processor, in this case, an NVIDIA Tegra 2 chip with dual ARM Cortex-A9 cores that run at 1GHz each. Paired to 1GB of RAM and 3D graphics support built in, the Atrix's performance is off the charts, clocking in a scorching benchmark result of 2,710 in Quadrant. This makes the Atrix second only to the Samsung Galaxy S II for raw power, but we couldn't distinguish between them in general use.

The Atrix's 4in qHD (960 x 540) LCD is equally delightful. Encased in sturdy Gorilla Glass, it comes close to matching the iPhone's Retina Display in pixel density, and works especially well in the web browser for seeing more of each page.

An HDMI port on the left outputs a custom multimedia interface at 720p (a software update will increase this to 1080p) for playing the photos, music and video stored on the 16GB internal storage or microSD card (full HDMI mirroring isn't supported). There's also a fingerprint sensor on the top that lets you unlock the Atrix by swiping your left or right index finger across the sensor; this works well once you get the hang of it, but the odd positioning on top of the power button means you're likely to put the phone to sleep.

The Atrix is a powerful smartphone in its own right, but coupled with its companion accessories, it can rightfully be described as revolutionary. The \$449 laptop converts it into an 11.6in notebook, while the \$129 HD multimedia dock lets you turn it into a desktop computer or high-definition media player for the TV.



Nokia C7

A lighter, slimmer and keyboard-less version of the E7.

www.vodafone.com.au

- ✓ Stylish hardware design; microSD expansion; strong battery life.
- ✗ Underpowered; buggy firmware; microSD card isn't hot-swappable.

Nokia's latest mid-range smartphone offers many of the features of its pricier siblings, but without the hefty price tag. So what does six hundred bucks get you in the Symbian's camp? Quite a lot, as it turns out. The C7 has the same 3.5in AMOLED 640 x 360 capacitive touchscreen and FM transmitter as the N8, the 8MP fixed-focus camera with 720p HD video recording of the E7, and the same 680MHz ARM11 processor, 256MB of RAM and pentaband 3G antenna of both devices. HDMI output has been left off the cards in favour of USB On-The-Go functionality (a USB host feature – although the requisite adapter cable isn't included in the box), and internal storage is a healthy 8GB with microSD expansion.

The fact that it runs Symbian^3 is probably the biggest strike against it, but first-time users will still find it a big step up from feature phones. The OS itself may not be as flashy or well-designed as competing platforms, however Nokia compensates for this shortcoming by cramming the C7 with lots of useful software. This includes a unified email inbox with push support for all the major email systems, free lifetime voice-guided GPS navigation with Ovi Maps, a full-featured web browser with Flash support, and a social networking app that aggregates Facebook and Twitter feeds.

Performance-wise, the C7 struggles when lots of apps are open, and web browsing performance in particular takes a dive, with sluggish panning, zooming and page rendering. The upshot of the slower processor is that the C7 has a longer runtime than its 1,200mAh battery would suggest. We were able to squeeze a day and a half of fairly heavy usage out of the C7 before it ran out of juice – and unlike the pricier E7 and N8, the battery is replaceable.



- 16GB STORAGE
- 176G
- FOUR-ROW QWERTY LANDSCAPE KEYBOARD



\$899

8/10



- 12MP CAMERA WITH XENON FLASH
- ANODISED ALUMINIUM CASING
- HDMI AND USB OTG CONNECTIVITY



\$639

8/10

Nokia E7

Nokia's best to date.

- www.nokia.com.au
- Excellent build quality; pentaband 3G antenna; USB OTG and HDMI ports
- Heavy at 176g; no microSD expansion; clumsy UI.

Ignoring for a moment that the E7 runs the much-maligned Symbian^3 OS, there's no disputing that Nokia makes beautiful hardware, and the E7 could very well be the best smartphone it's produced to date. Targeted at business users, the E7 comes packed with corporate-friendly features like Exchange and Lotus Notes support, VPN connectivity and document-editing software, but it's far from a one-trick pony. The E7 has equal appeal for end users too – a balance thus far elusive to other smartphone vendors.

One thing's for sure: you won't get anyone asking 'Is that an iPhone?' while you're toting the E7 about. While it has the same tapered corners as the Nokia N8, the screen has been upped to 4in, and the vibrant AMOLED display supplemented with Nokia's proprietary Clear Black technology, producing exceptionally deep black levels and excellent contrast. But that isn't even the best part. Sliding the screen up reveals a four-row QWERTY keyboard that in our opinion offers the best typing experience we've ever had on a smartphone. Obviously, Nokia has learnt its lesson from the tragic keyboards that plagued the N97 and N97 mini.

Multimedia mavens will appreciate the 8MP camera with 720p HD video recording, 16GB of internal storage (but no microSD expansion), HDMI output, DivX/Xvid video playback and Dolby SRs surround sound, while business users will like the USB OTG port (to connect USB flash drives with a bundled adapter), free voice-guided navigation, mobile hotspot and remote security features.

The Symbian^3 OS has received some flak for being outdated. The UI is clumsy, but taking the E7's excellent hardware features into account, we think it's as capable as other premium smartphones.

Nokia N8

An oldie, but still a goodie.

- www.nokia.com.au
- Class-leading camera; solid multimedia features, HDMI output
- Laggy performance, clumsy OS; non-replaceable battery.

There are worse things than opting for a six-month-old smartphone, especially when said device has a \$100 price cut and is otherwise still one of the most capable phones on the market.

The N8's trademark feature is its 12MP camera, which rocks a Carl Zeiss lens, Xenon flash and 720p HD video recording. This singlehandedly smokes every other smartphone camera in existence, producing beautifully sharp and well-exposed photos with lots of detail. Images can be saved to the spacious 16GB of internal storage and the N8 supports microSD cards up to 32GB.

The N8's multimedia chops are just as impressive. The video player can handle a range of formats, including DivX, Xvid, H.264 and MKV, and movies play beautifully on the brilliant 3.5in AMOLED display, helped by a powerful rear-mounted speaker. There's also HDMI mirroring at 720p/60Hz using the bundled HDMI adapter.

Nokia's newer E7 and C7 smartphones have inherited many of the N8's features: the HDMI and USB On The Go ports and non-replaceable battery have been passed down to the E7, while the C7 got the 3.5in AMOLED touchscreen and FM transmitter. Both were also saddled with the N8's poky 680MHz ARM11 processor and 256MB of RAM, although we're baffled as to why given how poorly it performs. It's the underpowered engine room more than anything else that lets the N8 down, resulting in a persistent sluggishness that makes the N8 almost painful to use at times.

Symbian^3 offers more than the standard suite of smartphone software, with lifetime turn-by-turn GPS navigation, push email across all of the major platforms, photo and video editing software, and a web browser that can play Flash video and animations.



Samsung Galaxy S II

Apple's closest challenger.

www.samsung.com.au

- Exemplary display, gorgeous TouchWIZ interface; scorching performance.
- 800 x 480 resolution is low, no search button on the front.

Don't look now, but last year's iPhone 4 killer has grown up to be Apple's worst nightmare: a superhero smartphone that could well leave the iPhone 5 dead in its tracks – assuming Apple even releases a new smartphone this year, which isn't a given.

The Galaxy S II's spec sheet reads like a power user fantasy phone. The 1.2GHz dual-core Exynos processor makes it the most powerful smartphone in existence, and it benchmarks accordingly, coming first in the Quadrant benchmark with a score of 3,131 (421 points better than the Motorola Atrix, and 2,000 points better than the original Galaxy S). Unfortunately, there's no global benchmark for all smartphone platforms, so you'll have to take our word for it when we say the Galaxy S II really is the fastest phone we've tested.

The 4.3in Super AMOLED Pro display is so vibrant it looks painted on. This 'fake phone' impression isn't helped by the waif-like dimensions; the phone weighs next to nothing at 116g, and its 8.49mm thickness makes the iPhone 4 look chunky by comparison. Its tiny girth makes the lack of HDMI port understandable, although there is an HDMI adapter that connects via the microUSB port.

The Galaxy S II runs the latest version of Android (Gingerbread) with Samsung's custom TouchWIZ 4.0 skin on top. Even those who prefer 'Vanilla' Android should be impressed with the additional widgets and apps, custom homescreen editor and extra settings and functions. Samsung has taken the standard Android experience and made it faster, prettier and significantly more capable.

There are many other features that make the Galaxy S II our top pick: 16GB of internal storage, microSD option, an 8MP camera that can record Full HD 1080p video and the long-life 1,650mAh battery.



Samsung Omnia 7

Unique for a Windows 7 phone.

www.optus.com.au

- Exceptional Super AMOLED display; stylish hardware design; good battery life
- Only 8GB of internal storage; limited customisation; no multi-tasking.

How to distinguish one's smartphone when limited by the same strict hardware and software requirements as every other Windows Phone 7 licensee? This is the dilemma Samsung faced when developing the Omnia 7, and we're pleased to report that it's done a better job than most at making the Omnia unique.

The secret lies in its exceptional hardware design. It's the only Windows Phone to use a Super AMOLED display, and the difference is obvious from the way colours pop off the screen and the wide viewing angles that don't wash out in bright sunlight. The single sheet of glass on the front makes the 4in WVGA screen look larger than it is, and the curved aluminium back sits nicely in the hand.

Other quality appointments include a powerful speaker, an above-average 5MP camera with lots of settings, and a 1,500mAh battery that should comfortably see you through a day's use.

With everything else, the Omnia 7 is a fairly run-of-the-mill Windows Phone. The standard 1GHz Snapdragon processor and 512MB of RAM combo applies, providing lag-free performance. The core set of software should prove attractive to business and end users alike, from the Office, Exchange and SharePoint integration, through to the Zune, Xbox Live and Windows Live applications.

Microsoft has done an excellent job at simplifying Windows Phone 7's UI compared to earlier versions of the OS, although power users may balk at the lack of customisation options and no multi-tasking, wireless internet tethering or microSD expansion. While the gorgeous screen, powerful speaker and excellent Zune software puts the Omnia 7 in good stead as a portable media player, just 8GB of internal storage is a let-down.



- 8.7MM THICK
- 4.2IN REALITY DISPLAY WITH MOBILE BRAVIA ENGINE
- HDMI OUTPUT



\$899

8/10

Sony Ericsson XPERIA Arc

Impossibly thin and capable.

- www.sonyericsson.com.au
- Vibrant display; sleek form factor; supports HDMI mirroring.
- Doesn't support many codecs; overpowering LED flash; flimsy battery cover.

The Arc joins a league of smartphones with twig-like waistlines, measuring 8.7mm at its thinnest. This makes it the second skinniest smartphone after the 8.49mm Samsung Galaxy S II. And just like the Galaxy, it's no less capable for its slight stature. It boasts a generous 4.2in 854 x 480 'Reality Display' with Sony's proprietary Mobile BRAVIA Engine, an 8.1MP camera with Sony Exmor R technology, HDMI output and a bundled 8GB microSD card – all wrapped up in an impossibly light 117g package.

The bright, contrasty 16:9 display isn't in the same league as Super AMOLED Pro or the iPhone's Retina Display, but it's a clear improvement over untweaked LCDs, and works well for movies at up to 720p HD – although video codec support hasn't been expanded beyond the Android defaults of H.263/H.264 MP4 files.

The Arc's 8.1MP camera uses the same backside-illuminated sensor technology as Sony's Cyber-shot cameras, making it better for low-light photography, but it's a shame the LED flash tends to overexpose photos at night. The camera launcher button on the right (something you don't see that often these days) comes in handy, as does the fact that you don't have to press it again to take a photo – it automatically snaps the shot after autofocus kicks in.

In other respects, the Arc is similar to the pricier XPERIA Play; both run Android 2.3.2 and are powered by a single-core 1GHz Snapdragon processor, 512MB of RAM and Adreno 205 graphics. But the Arc fared slightly worse in the Quadrant benchmark with a score of 1,382, making it the third-slowest Android smartphone in this roundup. Not that performance is really an issue; in day-to-day use, we found the Arc to be snappy and responsive across the board.



- BUILT-IN GAMEPAD
- 4IN 854 X 480 DISPLAY
- 175G



\$960

8/10

Sony Ericsson XPERIA Play

A smartphone for gamers.

- www.sonyericsson.com.au
- Built-in game controller; runs Android 2.3; bundled 8GB microSD card.
- Chunky; mushy hardware buttons below the screen; expensive.

Angry Birds, shmangry birds; dedicated gamers are looking to do more on their smartphones than sling freaky-looking birds at doom-a-lec pigs – or that's what Sony Ericsson is banking on, anyway. The XPERIA Play is as close as we're ever likely to get to the fabled 'PlayStation phone', and it looks the part with a slide-out gamepad that's almost an exact copy of the PS controller.

It's the world's first 'PlayStation-certified' device, enabling users to play repurposed PS games without having to install a dodgy ROM emulator. The only game available to us was *Crash Bandicoot*, but Sony Ericsson is promising 50 titles at launch. The gamepad supports standard Android games too, and ships with a decent selection of titles including *FIFA 10*, *Star Battalion* and *The Sims 3*.

In practice, the gamepad works beautifully for handheld gaming. The buttons are nicely raised with excellent tactile feedback, and the four-way directional pad and dual-touchpads were far superior for controlling the onscreen action over a touchscreen (although you can use that too). The stereo speakers pump out powerful, full-bodied audio, however the 854 x 480 LCD display could be brighter and washes out in bright sunlight.

We'd love the Play to have a dual-core processor and a gig of RAM, but then it might be even thicker and heavier than its 16mm and 175g. As it is, the single-core 1GHz Snapdragon processor, 512MB of RAM and Adreno GPU proved to be adequate; games load quickly and frame rates are smooth. In case you wanted to use the Play for something other than gaming, it's speedy for everything else as well, and the Quadrant benchmark score of 1,551 makes it the fastest single-core Android smartphone in this group test.

The iPhone 4's Retina Display is the highest-res smartphone display on the market.

The Nokia N8 has the best camera — ever. But how long will the Symbian platform last?

Samsung's Omnia 7, with its stellar display, is our pick — with the HTC HD7 a close second.

RECOMMENDED SMARTPHONES

iOS

Technically, it's a two-horse race here as the 3GS is still on sale alongside the iPhone 4. But really, the measly \$140 price difference between the 8GB iPhone 3GS and 16GB iPhone 4 is a pittance when you take into account all the extra features in the iPhone 4.

One of the things we like most about the iPhone is Apple's continued support for older models; most of the features from the latest iPhone have trickled down to its predecessors. Updating the 3GS's software to the latest iOS 4.3.3, for instance (assuming you're coming from its original software version), adds multi-tasking, application folders, threaded email and AirPlay support, among other features.

But most of the good stuff in the iPhone 4 is hardware-based and can't be passed on to older devices. This includes the 960 x 640 Retina Display, which is still unrivaled as the highest-resolution smartphone display on the market (the Motorola Atrix comes close with its 960 x 540 qHD display), the 5MP camera with backside-illuminated sensor, LED flash and 720p HD video recording, the front-mounted camera for FaceTime calls and self portraits, and the speedy Apple A4 processor. Essentially, this means the best smartphone running iOS is the newest one, although whether the iPhone 5 is as big of an improvement over the iPhone 4 remains to be seen.

Symbian-3 WP7

What's the best Symbian smartphone? That depends on whether you prefer an awesome QWERTY keyboard or the best smartphone camera ever made.

The E7 and N8 are the two most impressive smartphones to wing it out of Finland, and choosing between them isn't an easy task.

We could go down the traditional business user versus consumer route and say the E7 is best for suits and the N8 is best for everybody else, but that's far too simplistic an approach.

The E7's QWERTY keyboard works just as well for updating your Facebook status and writing text messages as it does for trawling through your work email and working on Word docs, and the larger 4in AMOLED with Clear Black Display technology is superior to the N8's in every way for watching movies.

On the other hand, the success of the iPhone in the enterprise market proves that business users are bringing their personal phones in to work with them, and they're just as likely to make use of the N8's stellar 12MP camera and FM transmitter after hours.

It doesn't help that the software on both smartphones is almost identical, as is the build quality and battery life. But once you add value for money into the equation, the N8's unbeatably low price tag makes it the clear winner.

Microsoft's iron-clad grip on Windows Phone's hardware and software specifications has had one significant shortcoming: all of the current devices look and feel almost exactly the same. Everything from the screen resolution, processor and camera through to the UI, storage size and button arrangement have been dictated by Microsoft, resulting in a cookie-cutter lineup of smartphones that's hard to distinguish between.

This isn't necessarily a bad thing for end users. The recipe Microsoft has cooked up ensures that every smartphone with the Windows Phone logo offers a strong user experience that isn't muddled by poorly performing hardware or unstable software additions — an issue that plagued smartphones running previous versions of Windows Phone.

But this also makes it difficult for us to recommend one Windows Phone over another. Out of the handful of Windows Phones available, the HTC HD7 and Samsung Omnia 7 are the best the platform has to offer, and it comes down to the slight yet significant hardware differences to determine which one is better. The HD7's 4.3in screen is slightly larger, but it's trumped by the vibrant Super AMOLED display on the Omnia 7. Throw in a 5MP camera, longer battery life and sexier hardware design, and our money's on the Samsung for the win.



Android

We've tallied all the numbers and the results are in: the Samsung Galaxy S II is not only the best smartphone running Android, but the best smartphone hands-down, beating the popular iPhone 4 and the other dual-core smartphones, the Motorola Atrix and the LG Optimus 2x.

The snappy 1.2GHz dual-core Exynos processor, gorgeous 4.3in Super AMOLED Pro display, sexy TouchWIZ 4.0 interface and sleek design all contribute to the Galaxy S II's rare 9.5/10 rating; a testament to how close it comes to being our perfect smartphone.

The runners-up are worth a mention too. The HTC Incredible S gets our pick out of the single-core Android smartphone lineup, and lives up to its model name by shoe-horning high-end specs into a mid-range price tag. But the strongest smartphone after the Samsung Galaxy S II would have to be the Motorola Atrix. It almost matches the Samsung's performance thanks to its dual-core 1GHz Nvidia Tegra 2 processor, 3D graphics support and 1GB of RAM, and distinguishes itself further with its HDMI output, quarter-HD 960 x 540 LCD screen and fingerprint sensor, not to mention the unique (albeit expensive) companion accessories that transform the Atrix into a notebook, desktop and HD media player.

If not for the Samsung's faster performance, superior screen and sleeker hardware design, the Atrix would've easily slipped into the top spot.

BlackBerry

Having stuck steadfastly to phones with small screens and physical keyboards while competitors were choosing large touchscreens, RIM eventually gave in and launched the BlackBerry Storm two and a half years ago.

The Storm had a 3.25in touchscreen which physically clicked when you selected something on it, a clever design that was meant to ease the shock of moving to a big flat piece of touchscreen glass.

The only problem is that the Storm didn't really work for anyone. On the one hand, it didn't have the physical keyboard (one of the two main reasons you buy a BlackBerry) and on the other hand, its app store was a poor imitation of what you got on an iPhone (it is slowly catching up though).

Times have since changed. RIM has launched the BlackBerry Storm 2, which is a much better phone all round, but it's only with the release of the BlackBerry Torch 9800 that RIM has got it right.

The Torch's 3.2in multi-touch screen is just a bit smaller than an iPhone 4's 3.5 display, but it slides up to reveal a classic BlackBerry keyboard, which really does give you the best of both smartphone worlds.

With a new graphical OS (BlackBerry 6) along with a 5 megapixel camera and excellent battery life, the Torch 9800 is the BlackBerry that virtually all RIM senior management were seen using at a recent conference.

That says it all really.

UPCOMING SMARTPHONES

For every smartphone on the market, there are five others waiting in the wings to take its place. HTC and LG in particular are notorious for announcing new smartphones before current devices have even shipped yet.

Before we went to print, Telstra announced it would be releasing the HTC Desire S and HTC Wildfire S, both of which are incremental upgrades over the original models. But it's the HTC Sensation and Evo 3D — neither of which has been confirmed for Aussie release yet — that has us all excited. Both come with 1.2GHz Qualcomm Snapdragon dual-core processors and 4.3in qHD Super LCD screens. At 148g, the Sensation is the lighter of the two and has an 8MP camera, while the heavier Evo 3D (170g) boasts a glasses-free 3D display and can shoot 3D photos.

LG also has a couple of smartphones in the pipelines that take some of the shine off the newly released Optimus 2x. The Optimus Black, which we're expecting to launch any day now, introduces a new 'Nova' display technology that claims to be twice as bright as other smartphones at 700 nits. The Optimus 3D — due in June or July — is even more impressive; it's a dual-core phone like the Optimus 2x, but has a glasses-free 3D display and dual-5MP cameras for 3D shooting. [CNET](#)



MONITOR THIS!

Lindsay Handmer tests a range of LCD monitors for different uses.

From professional panels to 3D gaming or bargain basement purchases, we could all do with a new LCD monitor or two. We've rounded up six of the most prevalent monitor types and broken down the technology in each.

We've covered the latest MVA technology, one of the biggest changes in LCD technology since LED backlights. If you require a professional-grade screen, we've got that as well. Gaming is an ever-growing market so we checked out

a monitor designed by gamers for gamers. For 3D enthusiasts, whether it's gaming or movies, we've got the newest in that department too.

Touchscreens are also making a comeback, so we looked at the tech behind them and put a brand new model on the test bench.

Finally we looked at what's in store for your LCD in the future as well as help you find your next bang-for-buck upgrade. We made sure we got some good hands-on time with as many monitors as possible to really see how they tick.

HOW WE TESTED

All screens were tested on our Windows 7 test bed machine with the same DVI or HDMI cable. We used a custom suite of LCD test images and video to check contrast, sharpness, colours, black levels and viewing angles. We also ran *PixPerAn* and *Far Cry 2* at the native resolution to check for ghosting. 3D testing was done with included 3D gear or our stock NVIDIA 3D Vision setup. Monitors were tested for reflections in both a darkened room and with background light.

Power consumption was measured by a standard consumption between the monitor and wall socket. Power use will vary with monitor brightness so any levels given are at default settings.

UNDER REVIEW



BenQ EW2430



LaCie 324i



Acer HN274H



Dell ST2220T



AOC Razor e2343F



Samsung CA550

MVA Panels

Multi-domain vertical alignment what?

Most of the LCD panels we know and love are based on twisted nematic (TN) technology. These panels have fast response times, meaning they can display quickly moving images without ghosting. TN panels have limited viewing angles and tend to only represent colours with six bits and are thus unable to display true 24-bit colour; instead having to resort to dithering. Despite these shortcomings, TN panels are very popular thanks to their low cost.

In-plane switching (IPS) panels can display a much better colour gamut than TN panels and have very wide viewing angles. They do suffer from slower refresh rates; though modern IPS screens have largely circumvented this. While they offer the most accurate colours and highest-quality image, IPS panels cost significantly more to produce and are typically only used in higher-end computer monitors aimed at the professional market.

Multi domain vertical alignment panels (MVA) were developed in the late 90s by Fujitsu as a compromise between TN and IPS technologies. MVA panels enjoy fast response times, while also being able to display proper 8-bit colour. They also have wider viewing angles than TN monitors, though not quite as good as IPS. MVA panels tend to have excellent contrast ratios and coupled with LED backlights they can provide very deep blacks. The biggest disadvantage of MVA panels is the tendency for colours to shift very slightly with small viewing angle changes, causing uneven brightness levels across the screen. While MVA monitors have been around for some time, a recent reduction in manufacturing cost has seen resurgence in availability. While not as cheap as TN panels, MVA provides an affordable screen which appeals to both professionals and high-end gamers alike.

Various manufacturers use MVA panels, however only AU Optronics and Chi Mei actually produce them.



BenQ EW2430

Sweet sweet VA goodness.

\$448

**6
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www.benq.com.au

- ✓ VA panel, 8-bit colour; wide viewing angles.
- ✗ 8ms response time; basic stand; high price.

We've looked at a number of BenQ VA panels in the past, including the BL2400PT and the EW2420. The latest in the range is the 24in EW2430. Gone are the boring stretches of matte plastic adorning previous models – replaced with brushed aluminium and a shiny piano black bezel.

As with earlier models, the draw is the high-quality yet still affordable vertical alignment panel. The LED-backlit screen runs a native resolution of 1,920 x 1,080 and has a 16:9 ratio. The static contrast ratio is a solid 3,000:1 while the dynamic ratio is up around 20 million to 1. The BenQ comes with a bunch of fairly good calibrated image modes, though if you're forking out the extra for this monitor you'll probably want to tweak it yourself. The VA panels means the BenQ displays true 8-bit colour and has nice wide viewing angles. The LED backlight is quite uniform and was impressively dark all the way to the edge. The 8ms response time is a little slower than a TN screen, so check out the XL2410T if you want fast-paced gaming.

Aside from the picture quality, the BenQ also has a few other handy features. Dual HDMI inputs as well as DVI and a VGA connection let you plug in whatever gear suits your fancy. The built-in 2W speakers are OK for general use and the four-port USB hub is great for cleaning up messy cables or plugging in flash drives. The basic stand offers tilt adjustment, though it does have a VESA mount if you want to stick it to the wall or install an aftermarket stand.

The \$448 rrp puts the BenQ out of the range of anyone on a budget, though if you shop around you should be able to wrangle a decent saving over an IPS monitor.

Professional

Sometimes a high-end monitor is the only way to get the job done.

Monitors aimed at professional markets come in all shapes and sizes. While some are designed for specific tasks, such as fold-down LCDs for server racks, most are dedicated to providing topnotch colour reproduction. Many high-end LCD screens also have a range of other productivity features, such as fully adjustable stands and multiple input modes.

If you're in the image or film manipulation industry, colour accuracy is your biggest concern. We don't notice it in day-to-day use, but the colours on our cheap TN monitors are not very true to life. They may look super-vibrant, but for designers and editors it's important that colours look exactly the same on the screen as they will on paper.

Almost all high-end monitors use IPS panels, though there's variation among even these from different manufacturers. A step above normal IPS panels is S-IPS, which offers some of the widest viewing angles possible on an LCD.

Refresh rates and contrast ratios are typically lower and might not be suitable for some video work. P-IPS and H-IPS are a newer variation that improve contrast ratios, response time and have a higher pixel density, improving the picture quality. Some cheaper professional monitors use MVA or PVA panels.

While most high-end monitors come factory calibrated, it's important to tune them to your environment. Some monitors come with the tools to do so, otherwise they can be bought separately. Professional monitors should be calibrated at least once a month to ensure total accuracy.

Of course a professional monitor isn't just about the picture quality. They typically also come with excellent warranties. Some top models offer in-house service and loaner monitors if yours needs to be repaired. This is particularly important if you're using the screens in a business setting where you can't afford any downtime.



3-YEAR WARRANTY



VERY WIDE VIEWING ANGLES



10-BIT 1.073 BILLION COLOUR



LaCie 324i

LaCie makes more than just fancy HDD cases.

\$1,999

**7
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• www.lacie.com.au

✓ P-IPS panel; accurate colours; versatile stand

* Calibration tool extra: very expensive; very minor backlight bleed.

The 324i is aimed at professionals and high-end users who want the very best quality image as well as the ability to calibrate it exactly to their work. The LaCie uses a true 10-bit P-IPS panel with the ability to display 1.073 billion colours and 98% of the Adobe RGB colour gamut. The 24in screen has a native resolution of 1,920 x 1,200 with a 0.270 dot pitch. The 6ms GTG response time is great for normal use or even gaming in your off-time.

Our screen came with the LaCie Blue Eye Pro calibration tool, sold separately for \$399. While the default setup is pretty good, it's a simple process to tweak and adjust. Colour reproduction is excellent both before and after calibration, even from very wide viewing angles. Very minor back light bleed through is visible around the top edge of the display on a dark screen, though overall the blacks are very dark.

You get an HDMI port, DisplayPort, DVI and a component input plus a two-port USB hub. The LaCie has a high-end stand that allows it to be positioned at just about any angle or height you want and you can rotate the screen in portrait mode. We did find it a little wobbly when it was fully extended, but not too bad considering the overall heft of the display.

While power use probably isn't much of a concern, the LaCie did draw a high but not worrisome 66W at the default brightness setting.

The monitor is backed by a comprehensive three-year warranty. Of course, the LaCie is in no way cheap and while it has a lot of high-end features, you can expect to pay at least \$1,900 for just the monitor.

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Dedicated
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3D and gaming

Want to play games that get all up in your grill?

The monitor needs for gamers are pretty straightforward. An LCD with fast refresh rates, low input lag and a decent resolution will more than satisfy. Of course price is always a factor, with more expensive monitors offering better colours and other handy features.

While it's not the newest feature, 3D-capable gaming monitors are finally starting to drop in price and become almost widespread. Most of the 3D-gaming hardware out there is built around the NVIDIA 3D Vision technology. Rather than the polarised glasses you love to hate from your local cinema, PC 3D uses active shutter glasses like 3D TVs.

While this setup provides very usable 3D, the glasses are bulky, need to be charged and are expensive. You also need a special 120Hz monitor. If you have a Radeon GPU your 3D options are rather more limited, with no dedicated hardware available. There are some suitable third-party 3D glasses and monitors available (as well as compatibility with some 3D TVs), but it will be some time yet before they're commonly available.

While it needs specific hardware, 3D gaming is pretty simple. Alternating frames from slightly different perspectives are displayed on your screen at 120Hz. A signal is sent via IR to your 3D glasses, which uses active LCD shutters to make sure each eye can only see one set of the alternating frames. This means each eye sees a slightly different viewpoint at 60Hz and your brain combines this into a single 3D image.

Unlike cinema 3D glasses, there's little leakage of images between each eye, making the 3D more defined. Since your 3D card already calculates and renders a 3D world, it's not much extra effort to render it from the differing viewpoints and little slowdown occurs. You're limited to a maximum of 60 fps in 3D mode though and, since the 3D glasses block some light, you might need to up the monitor brightness.

-  27IN 1,920 X 1,080 SCREEN
-  POWER EFFICIENT
-  INCLUDES 3D GLASSES



Acer HN274H

Billed as the world's first 27in 3D capable PC display.

\$699

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 www.acer.com.au

 3D ready; HDMI 1.4a; 120Hz refresh rate.

 Pricey; weak speakers; basic stand.

When it comes to 3D gaming, monitor choices are limited, especially in larger sizes. The just-launched Acer HN274H not only brings NVIDIA 3D Vision support, it can handle other 3D sources such as a compatible Blu-ray player, thanks to its use of the 1.4a HDMI standard.

One of the big drawbacks of the Acer is the large 27in screen and of course, the 120Hz refresh rate. As expected, it's LED backlit and runs at nice high 1,920 x 1,080 resolution. The response time is a low 2ms thanks to the TN panel, and local LED dimming provides a strong contrast ratio. The HN274H includes a DVI port, legacy VGA and three HDMI ports. While listed as having a brightness of 300cd/m2 it seems capable of much higher, ensuring the picture is not dark even through the 3D glasses. The Acer has a built-in IR transmitter and is bundled with a single pair of NVIDIA 3D Vision glasses, so you're somewhat limited to the one monitor.

In 2D mode, the Acer performs very well. Even with a matte screen, the colours are vibrant and strong with deep blacks. You can notice very minor light variation but it's fairly trivial. In 3D mode the monitor performed flawlessly on both games and movie playback and despite our best efforts we couldn't pick out any real crosstalk.

The Acer also has inbuilt speakers and while they're OK for limited use, we don't recommend you rely on them for sound. The minimalistic stand only offers basic tilt, though does so through 60°. In use, the HN274H drew 44W – more than most monitors but still not much more than a blip on your power bill. Since the Acer is brand spanking new, make sure you shop around for the best deal.

Touchscreens

Do we really want to reach out and touch the internet?

With touchscreens slowly getting integrated into every aspect of our technologically focused lives, it's kind of surprising that we've stuck with the good old mouse and keyboard for so long.

There are several touchscreen technologies available. Most modern phones use capacitive touch, where an underlying transparent network of contacts detects the change in capacitance from a finger. While this system is great on small devices, it doesn't scale well. It also means the screen can only be operated by a finger (or suitable capacitive stylus) and won't work with gloves.

Older devices tended to use resistive touchscreens, using pressure to physically make contact within layers on the screen. While cheap and easy to produce, they're sometimes unresponsive, need a fair bit of force and don't generally handle multi-touch.

Some high-end screens use acoustic sensing, where focused ultrasonic waves flow over the LCD surface. Placing a finger or other object on the screen blocks and reflects the sound, letting the computer calculate exactly where the finger is placed. Large device touchscreens such as the Microsoft surface use cameras to directly process inputs to a screen.

Typically, touchscreen AIO PCs and add-on monitors use an optical sensing method. Infrared LEDs beam light across the surface of the display where it's picked up by opposing sensors. Placing a finger or other object on the screen blocks the light, letting your PC calculate exactly where the screen is being touched. This setup also allows multi-touch, as the system can easily track multiple contacts. While fast and accurate, optical sensing can be disrupted by sunlight or other high-intensity IR sources.

While screens now typically come with built-in touch sensitivity, it's also possible to buy add-on kits to implement that feature. This can work in a number of ways, though the most popular is still optical sensing.



Dell ST2220T

Can a few innovations make PC touchscreens practical?

www.dell.com.au

Great stand; IPS panel; HDMI.

8ms refresh rate; tricky to use edges; smudges.

\$379

7
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One of the biggest drawbacks to touchscreen monitors is that it's a pain to use them. As futuristic as it seems, poking at a screen in front of you is just awkward. After more than a few minutes it's also very tiring, leading you to poke your greasy mitt into the screen way too hard and potentially damage something. While the Dell ST2220T doesn't do anything new technologically, it has an innovative stand that makes the touchscreen actually useful.

While you can use it as a traditional or touchscreen monitor upright, you can also lay it over at any angle you please. Standing in front of a touchscreen at 30° makes it actually pretty easy to use. You can even drop the Dell completely flat if needed. If I wasn't so clumsy with hot drinks, I'd love one mounted in our coffee table.

Unlike lower-end offerings, the Dell has a high-quality 21.5in IPS panel that runs at a resolution of 1,920 x 1,080. It has a 8ms response time, a 1,000:1 contrast ratio and a 250cd/m2 brightness. The extra wide 178° viewing angle on the IPS panels means colours are accurate even with the Dell positioned at any angle.

The ST2220T uses an optical touch system that offers a +/- 2.5mm accuracy. You can use your finger directly, though if you want to avoid smudges on the glossy screen, a stylus over 7mm can also be used. We found accuracy very good, even when making use of Windows 7 multi-touch capabilities. Still, sometimes it was hard to hit a close button right in the corner of the screen. Connectivity is handled by an HDMI port plus DVI and VGA connections and three USB ports. Small but acceptable speakers make the Dell totally multimedia ready.

Bang-for-buck monitors

Just because you're on a budget doesn't mean you should miss out.

It's easy to get caught up in the hype about the latest 30in feature-loaded IPS monitors, but they're just never going to fit into a bargain build. Fortunately there are a lot of great budget-focused monitors around.

Almost all monitors use TN panels and until recently, CCFL backlights. The new wave of LED-backlit monitors are steadily dropping in price and even offer the potential to save a little money on your power bill.

An informal survey of available budget monitors puts the sweet spot between 23in and 24in. This includes a whole range of 23.6in monitors. Until recently the best bang-for-buck LCDs were all 22in, but it's surprising how much things have improved. Of course, there are also plenty of 22in monitors kicking about that offer exceptional value for money, but it's hard to resist that slightly bigger screen.

You might have noticed that many of the affordable screens now run 1,920 x 1,080-pixel resolutions. This lets the manufacturers reduce prices by using the same panel in small TV sets and computer monitors. The 16:9 ratio is still great on your PC for gaming or surfing the net and has the added benefit of better suiting many wide-screen movies and television shows.

While it's tempting to shell out for the latest model LCD, the real savings are found in the slightly older stock. While there are some CCFL-based monitors on the shelves for bargain prices, it's still worth getting an LED-backlit model if you can.

While we say this all the time, take note that you should always shop around online for the best price. Web sites such as stafice.com.au and shopbot.com.au will help you find the best deal. Keep in mind that you'll have to add the shipping costs, as sometimes that super-cheap but far away hardware isn't such great value by the time it gets to your door.



AOC Razor e2343F

When thin also equals cheap, it's hard to resist.

\$230

7
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- www.aocmonitor-anz.com
- ✓ Super-thin; efficient; cheap
- ✗ TN panel; no DVI cable

The Razor is actually a bit of a surprise in the value-for-money category as it could just as easily feature with our future tech. While it doesn't do anything too crazy specs wise, it does measure in at a very thin 12.9mm. This might not seem like much of a party trick, but until you get such a thin monitor on your desk it's hard to truly appreciate the form factor. You can even use the base to wall-mount it if you want to free up more space.

The Razor has been on the market for a few months now – an ideal situation for getting maximum bang for your buck. What's more incredible is that if you compare prices online you can find the 23in model for under \$200 – in some cases cheaper than the 22in version!

The 23in Razor runs at 1,920 x 1,080 with a 60Hz refresh rate. It has a crazy high 50 million to 1 dynamic contrast ratio, which in real-world use translates to very deep blacks. It's a standard TN panel so colour reproduction and viewing angles aren't outstanding, but are excellent considering the price. It has a 5ms response time and while we've used faster, no ghosting shows up, even with fast FPS gaming. The Razor comes equipped with a DVI and VGA port, though annoyingly no DVI cable is included in the box. Thanks to the LED backlight and aggressive power-saving modes, the e2343F uses under 17W.

While it's not LED backlight, it's also worth noting the AOC 2436Vw. This older but still well-equipped 23.6in monitor can be found for less than \$180 online. It even has an HDMI port, letting it run double duty with a console or DVD player.

Monitors of tomorrow

With full HD LED backlit LCDs available for peanuts, what's left to crave?

Sometimes it can be hard to justify one monitor over another, with the multitude of options turning into an indistinguishable sea of purchasing indecision the longer you compare. Of course new technologies have to start somewhere, with countless monitors all touting the latest and greatest new breakthrough that's really about to disappear into obscurity.

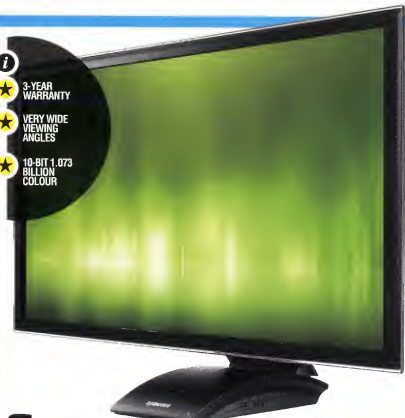
Fortunately there are some currently under-appreciated and upcoming technologies that are worth searching for. HDMI ports are a dime a dozen, but DisplayPort is poised to take over. Not only is it royalty free for manufacturers, the robust connector is available in a normal and mini size. Intel's Light Peak technology is also set to make a splash, especially with Apple products. It offers enough bandwidth for multiple monitors, the ability to transmit data over a long distance and provides a two-way connection. Wireless video connectivity is also starting to come of age and bringing with it a host of new mobility options.

VA panels also look set to make a play for a chunk of the LCD market, so much so in fact we've included an entire section of the technology. The slowly emerging 120Hz monitors are great for 3D but are also popular with gamers who want the very highest frame rates.

The next big shift in display dynamics is likely going to come from organic light emitting diodes, or OLEDs. Already used in smaller displays, OLEDs have a number of advantages. They use very little power, offer vibrant colours and brightness, are flexible and very thin.

Unlike LCDs, which are limited to around 200Hz refresh rates, OLEDs can potentially have a 100,000Hz refresh rate. While they're expensive to produce for now, OLEDs can potentially be manufactured very, very cheaply – bringing monitors to places and devices we can't even imagine.

-  3-YEAR WARRANTY
-  VERY WIDE VIEWING ANGLES
-  10-BIT 1.073 BILLION COLOUR



Samsung CA550 23in

Connectivity made easy

-  www.samsung.com.au
-  Connectivity, great stand, USB 3.0
-  No wireless; pricey; slight backlight variation

\$429

7
10

To earn a place on your desk, the Samsung is literally pockmarked with connections. These include four USB ports (two USB 3.0), HDMI, VGA, LAN and audio. But the real trick is being able to connect all of these to your PC over a single USB 3.0 connection.

What this means is you can have the CA550 on your desk with all your assorted peripherals connected, bar an actual computer. Then you can plop down a notebook, plug in one cable and have the instant full-size PC experience. You could also use it on your main PC, with the option to piggyback in and share the screen with your notebook when needed. There's also a wireless version that connects automatically when your notebook is nearby, though it hasn't yet met the regulations to actually be sold in Australia.

The screen itself is LED backlit, has a 1,920 x 1,080 resolution and while our model is 23in, you can also get a 27in version. As is the norm these days, colours are nice and vibrant without looking fake and the blacks are deep. There's very slight backlight variation, especially near the bottom right, but nothing noticeable in normal use.

The monitor is controlled via some funky touch-control buttons on the stand and while no speakers are included, there's a 3.5mm audio output so you can connect your own. The USB ports are all powered, so you can charge your phone anytime. The CA550 also has one of the greatest stands we've ever used and while it can't swivel, having the inputs in the base lets the screen itself contort to the point that it's pretty much laying flat on the desk. While the Samsung won't suit everyone, we can't wait until connecting any monitor is this easy.

Netbook size with notebook performance makes this HP feel like more than just a toy.



E
10

HP Pavilion dm1-3010AU

Notebook in netbook clothing?

HP

www.hp.com.au
\$699

Pleasant design; good performance for a netbook size; good screen. Some minor design niggles; loaded with shovel ware.



There's a clear line between notebooks and netbooks when talking about Intel processors. Notebooks use a full-power chip, like a Core i3 or Pentium processor, and netbooks use Atom processors. Since the introduction of the AMD Brazos platform and Fusion APUs, that line is much, much blurrier.

The HP Pavilion dm1-3010AU sits on that blurry line. It's a netbook price and netbook build, but the performance is up in the entry-level notebook range, thanks to its AMD Fusion E-Series Dual Core APU E-350 model chip. This chip, using its inherent graphics abilities goes a long way towards making this unit feel like a serious tool rather than lightweight toy.

On the exterior, it has a modern and pleasant design. HP uses its patterning tech to put a nice cross-hatched finish in the unit's lid, while the rest of the netbook is covered in silver plastic that somehow doesn't look tacky! The keyboard uses chiclet style keys, has a good amount of travel and is very comfortable to type on. The trackpad is probably the least impressive part, as with some

pressure it seems to click down like a button. It doesn't activate a left or right click though, which is a little concerning. If you're a light-fingered user, you might not notice, but if you're in the habit of tapping on and off the trackpad it'll get your attention. Apart from that, it was responsive and a sensible size.

The dm1 also sports a good combination of interfaces. There are three USB 2.0 ports, two on the right and one on the left of the unit, a VGA output for presentations, plus an HDMI output for those living in the digital age. An SD/MMC slot for memory cards is a solid addition, especially for those travelling with a digital camera. The Ethernet port, not often used these days, is the only one hidden behind a cover in the side of the unit. One annoying thing is the unit's propensity to go to sleep when the lid was moved down to around 45-55-degrees.

The screen is really quite nice. Though HP has chosen a highly reflective BrightView finish for the unit, meaning direct sunlight is its worst enemy, the 11.6in, 1,366 x 768 screen is crisp, clean and clear with minimal light bleed or abnormalities.

The unit's audio is courtesy of Altec Lansing speakers, and is acceptable to good for a unit of this size.

The dm1 looks great playing back video, even downscaling HD 1,080p content effectively for smooth playback, thanks to the AMD Radeon HD 6310M graphics support in the E-350 APU. It won't let you fire up *Brink* and go to town, but this level of graphics acceleration means video content and 3D optimisation in software runs smoothly.

The AMD E-350 is a dual-core 1.6GHz processor (with the aforementioned graphics integrated) and gives plenty of performance for general usage. Office tasks, and advanced or demanding web apps were no problem. The E-350 is paired with 2GB of memory, as well as a WD 320GB 5,400rpm HDD. And that's the rub; if there's one thing we'd change about the dm1 it's the hard disk drive. An entry level SSD would further increase the battery life from its very impressive measured 5 hours, as well as the performance. We'd consider it as an aftermarket upgrade without hesitation.

Nick Race



Samsung Series 9 Notebook

I'm walking on Air.

Samsung
www.samsung.com.au
\$2,499

Thinnest, lightest, fastest
and most exciting thin and
light out there. ✓
Custom Ethernet port, lots of
flex in the keyboard, relatively
low-res screen. ✗



Like the tablet market, Apple's dominance of the thin and light notebook segment has been an unassailable fortress. Since the launch of the Air in 2008, a few companies have had a half-hearted stab at making a vanishingly small, but still pleasant to use, notebook. Some made the thinnest, and some made the lightest, but nobody seems to make one that's worth buying. The whole industry then got sidetracked by netbooks, and everyone even forgot about the Air until the new model was released in late 2010. Then it was time to go another round.

This time, the Samsung Series 9 has stepped into the ring. It is in the thin and light product segment, but packs enough power under its 13.3in screen to still get your work done. But where it seems to matter most is in its measurements; the Samsung Series 9 is 16.3mm thick from the back and weighs 1.31kg. (The current MacBook Air is 1.36kg and up to 19mm thick at its wedge end, but thinner at its pointy end.)

We'll get to what's inside in a second, but the exterior is worth talking about. It's built from 'duralumin', an aluminium alloy commonly used in the aviation industry. It's stronger than

aluminium and still light. The Series 9's screen is a crisp and clear (and matte, which is refreshing) 1,366 x 768 'SuperBright' Samsung screen using LED backlighting. It's a pleasure to look at, but we can't help being disappointed with the relatively low resolution. Other 13.3in notebooks fit a 1,440 x 900 screen, which would have made this model just a little bit more useful.

The keyboard is a mixed bag, with the keys having a soft touch with a quiet but satisfying click. It's great to type on. Unfortunately there's a considerable amount of flex in the keyboard surround, with the whole top seeming to sponge down into the centre with a moderate amount of pressure. We're sure it's catered for; but it does feel a little like you're going to press two important pieces of electrical equipment into a brief but final embrace.

Inside the Samsung Series 9 sports some of the very latest and greatest in notebook guts. The unit is powered by a 1.4GHz Intel Core i5 2537M processor, which feels a lot snappier than it appears on paper. It's paired with 4GB of DDR3 memory and a 128GB Samsung SSD. The combination is distinctly snappy – and it puts many other notebooks we've tested to shame.

Thin and light models are often defined by what they don't have, and the Samsung keeps that list short. There's one USB 3.0 port, a USB 2.0 port, a micro HDMI output, audio in and out and a microSD slot. There's provision for Ethernet, but it's a dongle with an unfamiliar connector, which is always a great disappointment for when you inevitably lose the dongle and have to replace it. Throwing in a USB Ethernet adaptor and another USB port would have been infinitely preferable. Battery life on this unit is excellent. Considering its tiny size, the unit squeezes in a six-cell battery which we clocked at around 3.5 hours of actual usage.

Though it sounds like there are more downsides than upsides in this review, we've come at it at a particularly harsh angle. It's definitely not perfect, but it's so much better than many thin and light notebooks out there. What it does have going for it, it does brilliantly. It's supremely fast for its category. Its industrial design would make a tech enthusiast blush, and it is undeniably the thinnest, lightest and most usable thin and light we've seen. It's a premium product and it feels like it.

Nick Race

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Dell Inspiron 15R

Shiny, pretty, affordable.

Dell

www.dell.com.au

\$649

Affordable given the specs;
mostly solid build.
Keyboard flexes;
very shiny screen.

The Dell Inspiron 15R is an affordable notebook considering its specs. It has a Sandy Bridge Intel Core i3-2310M (2.3GHz) processor and integrated Intel Graphics HD 3000 that are heavy hitters for productivity applications and some intensive programs. There's also 2GB of RAM that leads to a respectable overall PCMark Vantage score of 4,668. A battery life of 4 hours 30 minutes in power saver mode ensures that this performance is long lasting.

The Inspiron looks good as well, but the 15.6in (1,366 x 768 resolution) screen is a bit too shiny for my liking. Everything else is similarly glossy, but around the keyboard the surface is matte grey. The back of the screen can be removed and replaced with some nice looking clip-on covers from Dell, but be aware that the plastic hooks on the cover are kind of weak.

Although the body's build quality is respectable, the chiclet keyboard

is not as good as it could be. Typing on it is mostly fine; there's a light amount of travel and while the direction keys are minuscule overall the layout is good. However, it does flex somewhat during usage which is disconcerting. The touchpad is nice; it's subtly and pleasantly rough to the touch and is responsive. There are some multi-touch commands, and while the buttons had a lot of give they worked well.

The rest of the specs are reasonable. A 320GB hard drive is small, but for the price it's a fair compromise. Port variety is excellent: there are two USB 3.0 ports, one USB 2.0 port, one VGA port, one HDMI port, one USB 2.0/eSATA port and a Fast Ethernet port. There's also a headphone jack, microphone jack, an 8-in-1 card reader and a DVD burner. Finally, there's Bluetooth 3.0 and 802.11

b/g/n Wi-Fi; connectivity in the Inspiron is remarkable.

I like affordable notebooks, and while shiny, the Dell Inspiron 15R is a real contender. The keyboard doesn't match the generally good build of the rest of the notebook, but it's still a reasonable option for a prospective notebook buyer on a budget.

Conrad Bem



7
10

MSI GT680-055AU

Wolf in tacky clothing.

MSI

au.msi.com

\$2,499

Amazing specs.
Ordinary build quality;
glossy screen.

The MSI GT680-055AU gaming notebook has excellent specs, but the appearance is unimpressive. Bright orange LEDs have been crammed in all over and while appealing, the high gloss finish of the keyboard, the 15.6in HD screen and the surrounding bezel is distracting.

The matte areas are plain and the case and screen have a worrying amount of flex in them. Overall the build quality is really ordinary.

The speakers looked cool but were average rather than extraordinary. Fortunately the chiclet keyboard works very nicely; all keys have low travel and the layout is normal. The touchpad is acceptable, but the buttons have an odd rough pattern. Although the included MSI mouse feels cheap it's serviceable enough.

Gaming is well taken care of by the T680. A potent Sandy Bridge Intel Core i7-2630QM (2GHz) processor and an NVIDIA GeForce GTX 460M are enough for new games like *Portal 2* on the highest settings. A preposterous 16GB of RAM has been crammed in, which while appreciated is kind of extravagant. Overall the GT680 pulls in a very strong PCMark Vantage score of 12,675. Battery life is a reasonable 3 hours 20 in power saver mode, but for serious gaming the GT680

should be running on mains power.

The specs continue to impress. A 750GB hard drive is supported by a 120GB SSD. Windows 7 Professional is installed and the boot times are very quick as a result. There is a dizzying array of ports; two USB 2.0, two USB 3.0, 5-in-1 card reader, eSATA, HDMI, Gigabit Ethernet, VGA and a quartet of audio jacks. The finishing touches are a Blu-ray burner, Bluetooth 2.1 and 802.11 b/g/n Wi-Fi.

I want to unreservedly recommend the GT680-055AU, but for all the good stuff it has inside the outside simply doesn't match up. The build quality and glossy surfaces detract from what would otherwise be a stellar product. Many will buy it for the specs alone, but just as many will opt for a similar spec'd notebook with the looks to match.

Conrad Bem



ROXIO

roxio Game Capture

**Capture, edit and share your
PS3® and Xbox® gameplay!**

Award-winning, real-time game capture, featuring advanced video editing and easy sharing features.

- Capture real-time gameplay from your Xbox 360 or PS3 to your PC while playing in full HD on your TV
- Add transitions, voice-overs and overlays to show off your best moves and scores
- Share on YouTube, Facebook or WebGame



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www.mindscape.com.au



ASUS Eee Slate EP121

Say hello to the iPad's big brother.

ASUS

www.asus.com.au

\$1,499

Powerful; excellent screen.

Short battery life.



If the iPad was pumped full of growth hormones and protein shakes, the EP121 would be the result. Looking eerily similar to Apple's wonder slate, but substantially heavier and larger, it's a Windows PC in disguise. Let's take a look at the goodies ASUS has managed to squeeze into this product's tiny 17mm depth.

At 12.1in across the diagonal, the 1,280 x 800 touchscreen might not sound like much, but it's crystal clear with excellent colour reproduction and contrast. A wide viewing angle makes it perfect for lunch-time presentations, and it's more than bright enough for outdoor use. The touchscreen is extremely accurate and very usable without a stylus, while typing on the pop-up touch keyboard is a breeze. This virtual keyboard can't be resized though, so it can sometimes obscure the application you're working in. A wireless keyboard is included for those who prefer to hear their keys

clacking. The screen is accompanied by a speaker on each side, and they're easily audible over the hubbub of a busy office or cafe.

Packing Windows 7, the internal hardware needs to be zippy enough to handle Aero's demanding requirements. The components are up to the task, with an Intel i5 470m CPU accompanied by 2GB of DDR3. During our hands-on testing, applications were very responsive, but doubling the memory to the optional 4GB is recommended given Windows 7's memory-heavy footprint.

Unlike the iPad's exceptional 10 hour battery life,

the EP121 will need a top-up after around 4 hours of standard use. Play movies continuously and this drops to just 2. Users looking for an extremely mobile solution might also find the 1.16kg weight a little tiring to carry all day.

If you're looking for a slate that runs Windows and is adept at presentations in less than ideal conditions, this is what you want.

Bennett Ring

Just like an iPad only bigger, stronger, more powerful; also heavier and lower battery life.



ViewSonic ViewPad 10s

Is this a great pretender?

ViewSonic

www.viewsonic.com.au

\$599

Slightly larger screen than iPad 2.

Everything else.

If you're going to make a grab for the iPad 2's crown, you better make sure you've got an army of quality features to back you up. The ViewPad 10s is priced at \$20 more than the cheapest iPad 2, which suggests the company believes it's a worthy successor to the throne.

Sadly, after spending just a few minutes with this device, you'll realise that it's more court jester than rightful heir.

The biggest strength of the iPad 2 is the gorgeous screen. This same component just happens to be one of the ViewPad's biggest flaws. Slightly larger than Apple's marvel of glass and silicon, the lower resolution of 1,024 x 600 makes it look noticeably grainier. Tilt the screen slightly downwards and the lacklustre viewing angle sees everything disappear into depressing darkness; upwards and the image washes out in white.

Based on our own personal usage of the iPad, most users will spend the majority of their spare time looking at sleeping Kittens on YouTube or poking friends on Facebook; it's all about the internet

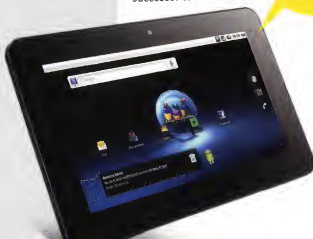
experience. Given that the ViewPad is equipped with Flash, it should offer the superior online experience, right? Wrong. Pages load slowly; scrolling and zooming stutters more than Colin Firth in *The King's Speech*.

The Android app store now has over 200,000 apps, but according to the ViewPad only 4,000 or so work with this slate. Presentation of these can only be described as threadbare, with simple text descriptions piling in comparison to the App Store. With only 512MB of onboard storage, purchase of an additional microSD card is essential, making the overall cost substantially more than the iPad 2.

If this is the best ViewSonic can do after several iterations, the iPad 2 is going to need some extra padding for its throne, as it's going to be residing there for quite some time.

Bennett Ring

The mediocre features of the ViewPad 10s mean the iPad will keep top spot.



E3
10

Acer Revo 100

Is this the perfect HTPC?

Acer 
www.acer.com.au 
\$999 
 Tiny; gorgeous; 
 wondrous remote. 
 Expensive; no Bitstream out. 



Thinner than the average Stephen King novel at just 29mm, this has to be the slimmest HTPC we've ever tested, not to mention the slickest.

And just because it's tiny doesn't mean it's underpowered, with an Athlon II Neo K325 processor, 2GB of DDR3 memory and NVIDIA's ION GPU. This provides more than enough oomph to decode 3D Blu-rays, supported via the optional Blu-ray optical drive. It's not quite game-worthy, but

With its slimline design, functionality and delightful touchpad, it's almost perfect.

Windows 7 response was fluid and smooth – surprising given the 1.3GHz frequency of the CPU.

HDMI and optical out allow easy insertion into your home theatre, while built-in Wi-Fi makes for even easier inclusion into your home network. Depending on the range between your router and Revo, you may prefer to go with the Gigabit Ethernet. We're not sure who

actually uses them (most people dump images off the camera onto the PC), but there's also a memory card reader on the front if you feel the inclination.

While the Windows 7 Media Centre interface is beautiful for media playback, Acer has also included its own media software for audio, images and movies. Surprisingly, it's rather good.

It's designed to work perfectly with the ace hidden

under the Revo 100's chassis – one of the sexiest wireless keyboard/touchpads ever created.

Measuring 155 x 115 x 7mm, it tucks away into the case for charging when not in use. Pop it out and it's a giant multi-gesture touch pad. Tap a button at the top and a full QWERTY touchboard glows to life. It's an absolute delight to use, allowing you to untap the potential of your HTPC from the couch.

There's one problem though, and it's a biggie – it doesn't do Bitstream out for DTS-HD or Dolby TrueHD audio. If you're spending this kind of money, you've probably got an expensive sound system that would make use of this.

It's rather expensive, but it's obvious that a lot of R&D dollars were pumped into this impressive machine. If only it had Bitstream audio out, the Revo 100 would indeed be the perfect HTPC.

Bennett Ring



7
10

Dell Inspiron 620

Unassuming power.

Dell 
www.dell.com.au 
\$1,299 
 Powerful; quiet; 
 gaming-capable. 
 No USB 3.0; whiney; no filters. 

While some of us prefer to avoid the big brands, Dell does stock a decent range of regularly updated gaming and home office PCs – the latest of which is the Inspiron 620. While not as high-end as some, it packs an Intel Core i5 2300 CPU with all four cores humming along at 2.8GHz. You also get 6GB of RAM and, thanks to Windows 7 Home Premium 64-bit, you can actually access it all.

The specs are enough to handle most applications and the 620 scored a very respectable 7,713 in PCMark Vantage. If you're after a machine that can run double duty with some light gaming, the Dell has you sorted as it sports an NVIDIA GeForce GT 420 GPU. While not hardcore-gaming worthy, it did score 2,350 in 3DMark Vantage and will happily run less intensive titles such as *Portal 2* or *StarCraft 2*.

Storage is handled by a single 1.5TB HDD, a Blu-ray drive is also

included. The covered front I/O port hides two USB connections as well as audio and microphone sockets and an SD card reader.

Round the back you get another six USB ports, though sadly these are all USB 2.0. You also get three analogue audio outputs, a LAN port and an HDMI and VGA connection for the unused Intel graphics chip. The GT 420 GPU features DVI and HDMI outputs as well as a legacy VGA connector just in case.

The 620 is fairly quiet under normal operation, even under heavy load it doesn't get any noisier, though it does seem to make an audible high-pitched whine.

The case is available in a range of front plate colours and includes a top recess that's a good spot to store your flash drives or keys.

There's an air vent round the entire front that's unfiltered, so you'll need to periodically clean the fans and heat sinks.

Lindsay Handmer



9
10

ASRock H61M/U3S3 mobo

A decent-priced board with features to boot.

ASRock **H**
www.asrock.com
\$109 **S**

A decent range of features. **✓**
Limited room for large video cards. **✗**

The 2nd Generation Intel Core CPU has proved to be a tasty little chip, with the budget versions surprisingly speedy for their friendly price tag.

With this CPU's video decoding abilities showing the GPU makers a thing or

two, it's no surprise that MicroATX motherboards are in high demand among HTPC builders. This ASRock board aims to cater to their needs without breaking the bank.

Fear not data lovers, while this motherboard does indeed use Intel's troublesome H61 chipset, it's the B3 stepping.

Unlike the original version of this chipset, Intel has resolved the nasty SATA corruption issue that plagued the first. It's cooled by a passive heatsink, so you won't hear the fan buzzing during quiet scenes.

Being such a small board, it's limited to dual DDR3 1333 memory slots, and has a single PCI Express 2.0 16x slot for your video card. Next to this reside a couple of PCI slots, but it's a tight squeeze – fill these and you'll have difficulty fitting

in a decent video card.

Given that HTPC owners often make use of USB slots for external hard drives, the inclusion of dual USB 3.0 ports (courtesy of the ASMedia ASM1042 controller) is a most welcome feature.

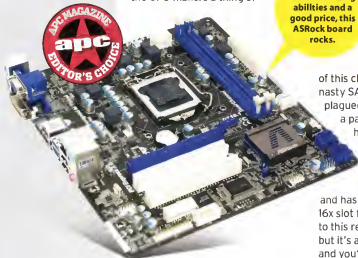
If you do choose to use the new chips for all video processing, the H61M has all your bases covered, with D-Sub, DVI-D and HDMI outputs ready for your big screen TV.

It's doubtful that you'll make use of the overclocking features in a HTPC, given the additional heat load, but it includes all the necessary options. If you do, the ability to mount LGAT75, LGA 1155 or LGA 1156 coolers means you won't need to upgrade your expensive Noctua cooler.

It might not look like much, but ASRock has your HTPC covered all with this little beauty. Throw in the cheap price and it's hard to resist.

Bennett Ring

With superior video decoding abilities and a good price, this ASRock board rocks.



8
10

Shuttle SX58H7 Pro

Can a tiny PC pack a truly hardcore punch?

Altech **H**
www.altech.com.au
\$649 **S**

Tiny; hardcore power: custom heat pipes. **✓**
Cramped; hot; noisy. **✗**

Despite now being a bit long in the tooth, the original version of the Shuttle SX8H7 is a favourite for miniature high-end gaming PC builds. The updated Pro version promises to let you relive the glory days, or at least

shrink down your LAN box thanks to a bunch of upgrades.

Inside is the same Intel X58 chipset, but it now has both USB 3.0 and SATA 6Gb/s support. This motherboard has a LGA1366 CPU socket and can handle the latest model Intel Core i7 CPUs (including hex cores), up to 16GB of DDR3 RAM and dual video cards under CrossFire or SLI. It also has a 500W PSU, ensuring even a monster system won't run short of juice.

The Shuttle is a barebones system, which means you need to purchase CPU, GPU, RAM and drives separately and install them yourself. For testing, we dropped in a Core i7 965 CPU, 8GB of 1,333MHz Corsair RAM, an NVIDIA GeForce GTX 580 GPU and a 120GB Intel SSD. With very limited room inside, the CPU mounts under a custom-built heat-pipe cooler that exhausts heat out the back. With our high-end setup,

performance is topnotch. We scored P18,965 in 3DMark Vantage, 112 fps in Far Cry 2 and had more than enough grunt to get superb frame rates when 3D gaming. The heat output by the system was intense but tolerable though it did get noisy under load. There was definitely no headroom for overclocking unless you run a much lower end CPU and GPU.

The Shuttle also has the usual features, such as eight rear USB ports (two USB 3.0 at the front), dual Gigabit LAN, eSATA, digital audio out and four SATA connectors, however you only get two 16x PCI-E slots.

At only 326 x 196 x 208mm, the SX58H7 is a tiny machine considering how much oomph it contains. For those who want to haul it along to a LAN party, our fully laden machine weighed in at a very dense 7kg – though it still offers an unbeatable performance-to-kilogram ratio.

Lindsay Handmer

There's limited room for extras, but the tiny SX58H7 has a lot of oomph.





Antec KÜHLER H₂O 620

The king of cases tries something new.

Antec
www.antec.com
\$119

- Easy to install; quieter than H70. ✓
- Hotter than the H70. ✗

It appears that Antec hasn't just borrowed a leaf out of Corsair's book with its debut entry into pre-built water-cooling solutions, it's photocopied it entirely. The KÜHLER H₂O 620 looks nearly identical to the Corsair H70 we tested towards the end of 2010, from the unique cog-like locking mechanism through to the 80mm radiator. We wouldn't be surprised if many of the source

components originate from the same Taiwanese or Chinese factory as Corsair's too.

If you've never installed a water cooler before, fear not – the chances of splashing your expensive new components with water when installing this kit are slim to none. Antec has kindly put everything together in the factory, so all you need to do is mount the backing plate behind your motherboard, find a spot for the radiator and sit back as your overclocked CPU temperatures plummet. It doesn't matter which type of CPU you're armed with, as the 620 will happily attach to basically every variety released in the last five years.

Using the exact same twist and lock mechanism as the Corsair, ensuring a snug fit on your CPU is a breeze. We removed the generic thermal

gunk provided by Antec, instead using our beloved Arctic Silver cooling paste. Installing into a case took just 15 minutes, though your time will vary depending on whether you have easy access to the rear of your motherboard.

Firing up our Intel i7 870 on a Gigabyte P55A-UD6 motherboard, Prime95 was wheeled out for 45 minutes to get the processor all hot and bothered. At the end of this test the CPU temperature peaked at 55, making it around 10% hotter than the H70. Don't run away yet though, as the Antec was significantly quieter than the Corsair, running with a manageable hum rather than the Corsair's annoying buzz.

It might not tame your thermal beast quite as much as the H70, but for \$30 less and no worries about audio pollution, Antec's first entry into water-cooling should be applauded, original or not.

Bennett Ring



You won't get any splash splash from this water cooler. It's pre-assembled and easy to install.



Noctua NH-C14

CPU heatsinks just got smarter.

Noctua
www.noctua.at
\$110

- An extremely flexible and high performing heatsink. ✓
- Not enough clearance for very tall RAM sticks. ✗

Noctua is not new to the market but it has started to make big waves with Australians in the past 12 months. Another addition to its already strong collection of heatsinks is the NH-C14, targeted at the HTPC market but offering much more.

The C14 is a top flow design, which means the heatsink lays flat across the top of the CPU as opposed to the traditional standing design. This top flow design is combined with a pair of Noctua's famous 14cm fans to offer a high level of heat dissipation. As always, heatsinks from Noctua come with the SecuFirm2 mounting system that allows flexibility and ease of mounting and supports all the major platforms including LGA1155, which is the socket from the new Intel P67 and Z68 platforms.

The C14 is offered for use in computers requiring a low profile heatsink, but this unit can be

mounted in a number of ways to suite the application. The traditional way is to mount the heatsink with both of the 14cm fans included, which gives it a height of around 12.5cm, low enough to fit in most HTPC builds. Another option is to remove the top fan, forgoing some performance but lowering the profile to only 10cm. This allowed us to mount the C14 in a classical small form factor case and a 2RU height HTPC case with no problems. Lastly you can leave the top fan intact but remove the bottom fan – this allows you to install RAM modules in the last 2 slots.

Overall, the NH-C14 is a very impressive unit and the ability to remove the

bottom fan and raise the RAM clearance addresses the main issue we had with Noctua's massive NH-D14 heatsink, although you still might have some clearance issues with some of the taller RAM kits on the market.

James Travaskis



7
10

BitFenix Shinobi

BitFenix sends in a ninja.

BitFenix
www.bitfenix.com
\$79

Simple yet solid. ✓
Lacking in features. ✗

Squidgy. That's the word that springs to mind when touching the SoftTouch surface treatment of the Shinobi. Covering the edges and front of the case, this rubbery finish has the same slick matte black look that today's outlaw biker gangs favour on their custom hogs.

The application of this scratch-resistant material on the edges is a clever touch, given that this is the area most commonly abused when moving your PC around.

Styled after the Monolith in 2001, the plain black design is as simple as cases get. With a solid front, it relies upon the top and rear grills to provide air circulation. Just a single fan is included in the box, so you'll need to shell out for up to six more to ensure your silicon doesn't reach meltdown.

There aren't any fancy trimmings on the outside of the case, just the usual four USB 2.0 ports alongside microphone and headphone inputs.

The interior is similarly bare, though the nicely rounded edges of every steel surface help to keep your fingers divot-free. It's all built Tonka tough, with no flexing or warping, even with plenty of weight on top of the case.

The removable motherboard mounting tray is now par for the course in today's cases, as are the water-cooling inlets. Ditto with the tool-less drive mounts. Those who have experienced the nightmarish scenario of having to replace a heatsink mounting bracket will appreciate the gap on the motherboard tray, allowing quick HSF swaps without having to remove the entire

motherboard. And that's about it – unlike the last BitFenix case we reviewed, this is definitely a no-nonsense, low-tech affair. Given the affordable price, that's fine by us.

Bennett Ring



Scratch-resistant = good. Black squidgy surface = cool. Features: not as many as we hoped for.

7
10

Cooler Master Storm Enforcer

Unleash the gamer within.

Cooler Master
www.coolermaster.com
\$129

Solid feature list; well built. ✓
Similar to all the rest. ✗

Looking like a giant glowing robotic trilobite, there can be no doubting which PC segment Cooler Master is targeting with this case. If you're a hardcore gamer in the market for a LAN-friendly mid-tower solution that won't break your student benefits budget, you'll probably find the feature list all kinds of "radical" and "gnarly".

At this price point, we can excuse Cooler Master's reliance upon plastic for much of the case's exterior. At least it's nice and chunky plastic, so it

probably won't shatter when it slides off your LAN table after 36 hours of continuous play.

A swinging door hides your external drives, while the four USB ports (two of which are super speed USB 3.0) and headphone/mic jacks reside above it. Beneath this sits the air inlet for the whopping 200mm fan that's strapped to the front of the case, and which is packed with red LEDs to lend a menacing look that's sure to scare your opponents. It's not tamed by any kind of fan controller though, so be prepared for the inevitable whoosh every time you power up the PC.

Despite being a mid-tower, CM has borrowed technology from the Tardis to deliver a surprisingly roomy interior. Four exposed 5.25in and six 3.5in bays await your torrent collection, along with another two 2.5in bays. If you're packing more SSDs, two of the 3.5in bays can be

converted for the job. With the hard drive cages in their usual position the case can just fit an 11in video card, not quite big enough for the gargantuan ATI Radeon HD 6990. No matter though, as the middle drive bay can be moved to allow room for these stupidly long cards.

The motherboard tray isn't removable, but it does have a CPU cut-out and plenty of holes for cable tidying. While the drive bays are all tool-less, it appears CM's warehouse has run short on thumbscrews, using standard Philips-head screws instead.

There's only one issue with this case – it's basically feature identical to many other gamer mid-towers in the \$130 price range. Which one you end up choosing will probably come down to aesthetic taste more than anything else.

Bennett Ring



This gnarly beast has what you want with its solid features and build – but so do others.



Corsair Obsidian 650D

Corsair's on the case with this premium box.

Corsair
www.corsair.com
\$259

- Sturdy; roomy; excellent cooling. ✓
- Expensive and slightly loud. ✗



It's not just the price tag that flags this as a designer case; the soft fabric protector it arrives in shows that Corsair has spared little expense to deliver a product for the discerning PC builder. The plain square lines of the brushed aluminium face don't scream for your attention, but removing the side panel reveals a wealth of features.

The case's skeleton is constructed of heavy duty steel, providing reassuring rigidity for those who want to fill it to breaking point. Each side panel uses quick release lugs, offering easy

access without needing to fiddle with screws, opening up to reveal a generous four 5.25in and six 3.5in or 2.5in drive bays. Two gargantuan 200mm fans pump cool air into the top and front of the case, with easy to remove dust filters. There's another 120mm fan at the rear, and all three connect to a three-speed fan controller tucked away in a hidden bay on the top of the case. Even at their slowest speed they're audible, though, which might prove a problem for those who demand silent computing. The top bay also houses the hot swappable SATA 6Gb/s dock, perfect for those who want a convenient way to dump their data without paying extra for an external drive.

Inside is the obligatory removable motherboard tray complete with CPU cut-out, making HSF swaps a breeze. The tray is festooned with additional holes for the obsessive compulsives to neaten the cables, and they're all

lined with rubber to stop abrasion.

Those with a fear of screwdrivers will appreciate the tool-less design of the drive bays, which also use rubber grommets to isolate them from vibration. With its extra large length, today's super-video cards will fit in with room to spare. If these stupidly long cards get any bigger, simply move the customisable drive bays around and you'll have even more room to move. Tucked away inside a flap at the front are the usual mic and headphone jacks, along with two USB 3.0, two USB 2.0 and a single FireWire port.

If you don't mind a little fan noise and have money to burn, the excellent thermal performance of this case will ensure that your components don't fry. It's primarily recommended for the overclocker or performance user who is looking for a mid-sized case that ticks all the right boxes.

Bennett King



Zalman Z9 Plus

Not quite a champagne case on a beer budget.

Zalman
www.zalman.co.kr
\$99

- Cheaper than a night at the pub... ✓
- ...but not half as much fun. ✗



If Porsche released a budget 1.6 litre hatchback that retailed for less than a Corolla, we'd all be rather perplexed. That's exactly how we felt when we first saw the Zalman Z9 Plus; since when did this premium manufacturer, known for making PCs run quieter than a sparrow's burp, start churning out budget cases?

At less than \$100, you'll be hard pressed to find a cheaper case that isn't made out of cardboard and duct tape. While it doesn't exactly look like a million dollars, Zalman has been smart enough to favour a simple design, making it appear more expensive than it is. There are even a couple of windows on the left side, through which calming blue LEDs make your steaming GPUs and CPU appear icy cool.

Not that they'll overheat in this case's default configuration; with four cooling fans it provides a refreshing breeze to your

components. Thanks to the included temperature probe you can even keep tabs on the climate within, just in case you get a severe case of localised global warming. If things get too steamy, simply use the fan controller on the front panel to boost your fan speeds.

A removable motherboard mount makes construction easy, and it's got the beloved HSF cut-out that makes switching coolers a cinch. There's not much in the way of cable management, though there are a couple of inlets for water cooling. It's built primarily of steel, ensuring a solid structure, though the plastic face panel won't handle too much of a beating.

It might not be packed with hot swappable drive bays, USB

3.0 ports or crumple toasters, but for the price the feature set is rather impressive. It's not the Porsche of the case world, but by no means is it a rust bucket.

Bennett King

Impressive package — it's no Porsche, but it'll get you to your destination.



6
10

Intel SSD 320 Series 300GB

What price will you pay for reliability?

Intel

www.intel.com
\$790 (based on US pricing)

Excellent reliability; better sequential write speed. A long way behind the new SF-2200 and other 6Gb/s SATA SSD drives.

Installing an SSD into your PC is one of the most noticeable ways to improve performance. SandForce-powered SSDs were, until now, the best way to do it. Their balance of affordability and performance helped them leave Intel's drives languishing in the overpriced, under-delivering bin. But the new Intel SSD 320 Series aims to shuffle the

mainstream leaderboard.

At first glance, this third generation drive appears to be packed to the gills with new tech. 25 nanometre NAND replaces the 34nm memory of the X25-M G2, allowing for a greater capacity (up to 600GB for those with deep pockets) while full disk 128-bit AES encryption makes it worthy of even Osama's deepest secrets. It still uses the same 3Gb/s SATA interface, but that's not really a hindrance unless you're packing a premium motherboard with a 6Gb/s controller.

Closer examination reveals that the SSD controller on the 320 series is the same as the last generation, but with a firmware update for better performance and reliability. These refinements result in a drive

to show the SandForce SF-1200 a thing or two... which would have been fine had the SandForce SF-2200 not been waiting in the wings.

Our CrystalDiskMark benchmark shows that the greatest leap in performance is when writing to the drive, with sequential write speed clocking in at 181MB/s, more than double the speed of the X25-M, and edging out SF-1200 drives by around 5%. This has come at the cost of sequential read performance though, dropping to 217MB/s from the X25-M's 263MB/s. The result is a drive that's up to par with SandForce's last controller, but way off the pace of the incoming SF-2200.

If there's one thing in Intel's favour, it's reliability. With a tiny 0.4% annual failure rate, Intel's SSDs are undoubtedly the safest place to store your critical data. Whether you're prepared to sacrifice cost and performance is another matter.

Bennett Ring



Intel's SSDs are reliability kings — you may just lose out a little on performance and cost.

8
10

WD My Book Studio Edition II

For those who like to upsize their life.

Western Digital
www.wdc.com
\$719

RAID 0 or 1; plenty of connection options. Where's USB 3.0?

Most mere mortals won't need a 6TB external hard drive until at least 2015, but then again video editors can't be considered merely mortal. Aimed at Mac-using creatives, this monolith of storage tech is overkill for the rest of us, but does it have what it takes to satisfy the most demanding of users?

Apparently Western Digital hasn't heard of Adobe Premiere for PC; if they had this external drive would have included a blistering USB 3.0 port. However, it's got the usual Mac-focused alternatives instead, with FireWire 400 and 800, USB 2.0 and eSATA. From a distance the case looks like brushed aluminium, fitting right in alongside a Mac Pro, but it's actually plastic — disappointing for those who need rugged enclosures.

Wrapped within are two WD 3TB Caviar Green drives, spinning at 7,200rpm. These drives can be paired up in RAID 0 or RAID 1 configuration, depending on your

taste for performance or protection. Windows users will need to format the drive out of the box as it's delivered ready for Apple use.

Just because it's targeted at video users doesn't stop this from being a mean back-up solution for data-heavy households. To this end WD includes the WD Anywhere software, a solid if unspectacular package that automatically backs up important files.

We tested the performance of this drive in RAID 0 mode connected via FireWire 800, and found sequential write performance averaging 25MB/s, while read performance was 37MB/s.

Power users should make use of the eSATA connection, which will further improve these already respectable results. It's perfect for demanding users who need both space and performance. The lack of USB 3.0 or a ruggedised exterior holds us back from giving this data behemoth a glowing review.

Bennett Ring



The 'brushed aluminium' is actually plastic, so not as rugged. It performs a treat, though.



9
10

Antec TPQ-1200 OC Edition

Antec brings overclocking features to its TPQ-1200 PSU.

Antec
www.antec.com
\$320

Finally a PSU manufacturer offers enthusiasts more flexibility. Where is the on/off switch?



Antec is a brand synonymous with quality cases and mid-range power supplies but of late it's diversified into other areas, including enthusiast power supplies. With the TPQ-1200 OC, Antec has taken the popular Quattro 1200 and added a number of new features for the uber-enthusiast.

The Quattro 1200 is no slouch, providing 1200W of continuous power with an 80 Plus Silver certification, meaning it supplies 85% efficiency at all times. The original Quattro 1200 also offers eight PCI-E, 11 SATA and nine Molex connectors, enough to power even the most demanding rig. Not satisfied with all that, Antec has added another four PCI-E connectors and two performance adjustment knobs to create the TPQ-1200 OC.

The first of the two new adjustment knobs controls the speed of the PSU fan, ranging from silent to what sounds like an aircraft taking off. Whether

the average user would ever need to adjust their fan speed is questionable, but for those pushing the PSU to its limit, this functionality is essential.

The 12V rail adjustment knob is where things get interesting. Users with power-hungry graphic cards often experience crashing due to power stability issues. This can occur even with a huge 1,200W power supply driving the system. The 12V adjustment knob offers users the ability to compensate for this instability by raising the 12V rail voltage on the PSU. We're slightly frustrated that

Antec didn't include an on/off switch on this PSU – we were forced to turn the PSU on and off at the power point instead. The TPQ-1200 OC is just what enthusiasts running multiple

graphics cards have been waiting for – the ability to tune their PSU to suit their requirements.

James Trevaskis

A power supply that's flexible enough to cater to enthusiasts with multiple graphics cards.



6
10

Turtle Beach PX5

Is there anything they can't do?

Turtle Beach
www.turtlebeach.com
\$299

Surround-sound; cheap solution for console owners. RF interference; average audio quality.

Packing more sound functionality than a Hi-Fi store, these wireless gaming headphones appear well worth the stratospheric asking price. Provided your PC has an optical output, the base station operates as a radio transmitter for wireless use, as well as delivering Dolby Headphone support. This mimics 7.1 sound via the use of Head Related

Transfer Function algorithms. It sounds fancy, but in use basically means audio cues from the rear are slightly cropped at the high end.

It allows gamers to identify inbound threats quite accurately, but it's not as immersive as a true 5.1 or 7.1 setup. We had issues with the wireless reception, with regular pops and crackles at a range of just 1m.

Apparently it's an issue with certain routers sapping up all the available RF bandwidth, but it's not common so your mileage may vary.

If you don't have an optical output on your PC you're out of luck – the lack of a USB port on the base station means it can't be used as an external sound solution, which is disappointing considering it's got all the necessary hardware.

The headphones pack Bluetooth,

allowing you to receive phone calls while gaming, a novel feature for those who prioritise game time over everything else. There are 18 sound presets, which can be used to tailor in-game sound, such as making footsteps louder or increasing the bass. While these work, they make overall sound quality rather horrid, so we stuck with the default EQ.

There's a noise cancelling mic for chatting, but there's no rechargeable battery pack – twin AAs are used.

As for the sound quality, this is definitely better than cheap Apple earbuds, but pales in comparison to a decent set of \$200 Sennheisers or Audio Technicas.

We'd have to recommend a good set of cans paired with a cheap ASUS Xonar DX over the PX5, which will deliver superior 5.1 headphone audio for the same price, though you'll have to pause your game to take a call.

Bennett Ring

You can get superior sound quality for less, but it will do as a faux-surround-sound system.



**E
10**

Fuji Xerox DocuPrint CM305 df

Proving money can buy quality.

Fuji Xerox
fuji-xeroxprinters.com.au
\$799

Great print and copy quality.
Documentation needs
improvement.



Software
Installation
was clunky but
print and copy
quality proved
topnotch.

At nearly \$800, the DocuPrint CM305 df seems relatively expensive for a small office MFD. But it's also relatively speedy and delivers great prints and copies. While the physical setup is easy enough – and assisted by a series

of animated instructions – we would prefer a less operator-intensive approach to software installation. Instead of collecting the desired options and then carrying out the user's wishes, each utility – including the scanner driver – must be installed individually.

Although the printer supports duplex operation as standard, the scanner's ADF is single-sided which was a slight disappointment.

We timed the CM305 on our usual business document and recorded a first page out time of 16 seconds (as claimed, to the nearest second) and a run-on speed in line with the claimed 23 ppm. Printing a job immediately after the previous one completed shaved two or three seconds from the first page out time.

Print quality was above average for text, graphics and photos.

As usual with laser and LED printers, there was some loss of detail in the shadows.

The CM305 performed especially well on our 'all black' test, giving one of the most uniform finishes we've seen. The copying function also impressed with its outstanding colour reproduction. Some of the sky tones tended slightly towards purple, but the matching of greens and browns was remarkably good.

We didn't like the way network scanning is to shared folders. It avoids the need for additional software on each computer, but there's nothing to control access to particular folders as usernames and passwords are stored in the printer. Other options include emailing the scan, saving it on an FTP server, or storing it on a USB device plugged into the port on the front of the scanner unit. That port also allows standalone printing of PDF files.

Stephen Withers

**7
10**

HP Officejet 100

Printing on the go.

HP
www.hp.com.au
\$449

Good photo printing.
Larger and heavier
than we'd like.

Mobile printing is a niche requirement – most people don't need it, but it is essential for some.

Physical specifications are important in this context, this unit measures 35 x 17.5 x 8.5cm and weighs 2.3kg. The removable battery adds a little over 2cm to the depth and 200g to the weight.

That's approximately the same size and weight as the older Officejet H470, and just a little larger and heavier than Canon's iP100. However, HP's external battery is said to be good for 500 pages compared with the iP100's 290 pages. Another point of contrast is that the Officejet 100 has Bluetooth as standard, whereas that's an optional extra from Canon.

The software bundle is limited to the basic operating software plus a utility for online shopping for

consumables and (yet another) Internet Explorer toolbar.

As for performance, HP claims up to 3.5 ppm for "colour (laser comparable)" but our two-page test document took 69 seconds, ie less than 2 ppm. Despite being on the slow side, the print quality was as good as we've seen recently from desktop inkjet printers. HP's inks give vivid colours without being over-bright, and black text is smooth and dark.

HP touts the 'lab-quality' photo

printing capability of the Officejet 100, and the results are pretty impressive with an even gloss and decent colour rendition.

Most people wouldn't blink if handed a photo from this printer. A 15 x 10cm print took 2 minutes 36 seconds at best quality.

Printing from a mobile phone via Bluetooth and from a camera using PictBridge both worked smoothly.

All told, this is a useful product. Sure, we'd rather it was smaller, lighter and faster, but it's hard to argue with the quality of the output.

Stephen Withers

Fits the mobile
printing bill to a tee, which
admittedly is not
an enormous
market.



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Austin Computers 08 9201 2788
Disc World 08 9329 9757

5
10

iTunes 10.2.2

Not so hot as a video player.

Apple

www.apple.com

Free

Manages files; shares files between computers on a LAN. Supports a limited number of codecs.

iTunes is a widely used media player thanks largely to the hugely successful iPod, iPhone and (more recently) iPad. It's an extremely convenient program for managing content on a computer and these devices, but how does it shape up as a video player?

In general, not very well. The main problem is that it supports a limited range of codecs, so don't expect to be able to play your collection of AVI files or Matroska videos with it.

If you want a versatile player that plays many and varied formats, this isn't it.

Another issue is iTunes comes with overheads in the form of QuickTime, Bonjour and other items. That's understandable given that iTunes relies on QuickTime for many of its functions and Bonjour for library sharing, but some people consider it bloatware because they don't need all those functions. It's largely a question of expectations: if you expect iTunes to recognise a shared playlist on another computer on the network or if you want iTunes to 'just work' when you connect an iPhone for the first time after using your old iPod for years, you'll like Apple's

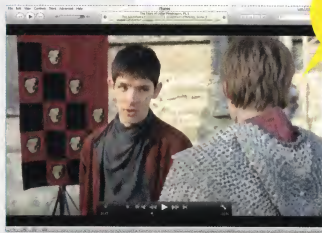
approach. If the presence of non-essential processes or services bothers you (even if they use so little CPU time that Windows Task Manager reports it as zero), you might not.

Video library organisation is limited to genre, but Apple's Cover Flow representation can be a convenient way of flipping through a collection.

Videos can be played back in the main iTunes window, in a separate window, or full screen. If you don't want to watch the intro or the credits, it's possible to set the start and stop points for an individual video.

If you're not already using iTunes with an iDevice, it's hard to come up with a reason for using it as a video player – except in conjunction with content that you've purchased or rented from the iTunes Store.

Stephen Withers



7
10

VLC 1.1.9

The Swiss army knife of media players.

Videolan Organisation

www.videolan.org

Free

Network streaming and playback; broad compatibility. Little to help manage a video library.

Some people keep VLC around as a last resort, in the sense that if their preferred player won't handle a particular file, VLC probably will. An inability to play DRMed files such as videos purchased from the iTunes Store is the main limitation.

But considering VLC only in those

terms is selling it short, because it is a capable media player.

In addition to playing back files, it can play DVDs and network video streams, or use a video capture device such as a TV tuner (we didn't test this). Apart from DRM issues, the only major problem we encountered was choppy sound from certain digital TV recordings (MPEG files) that played correctly in other apps. Video playback was fine.

For those occasions when you've got too much or too little time on your hands, VLC can vary the speed of playback between 0.25x and 4x, or step through a frame at a time. We like being able to jump backwards or forwards with a keystroke, but rather than using various modifier keys to control the distance (5/10/60 seconds) we would prefer the ability to choose how many seconds the left and right arrow keys jump.

Other facilities include changing

the aspect ratio, cropping, rotating or resizing the source material, and applying filters. Full screen playback is also available.

VLC does little to help manage or organise a video collection. Its media browser is smart enough to look in locations such as My Videos, and also provides a Media Library that appears to be a purely manual way of arranging files that are stored in different locations.

We would recommend keeping an up-to-date copy of VLC on hand for the way it resembles a Swiss army knife in terms of codecs and capabilities, but annoyingly this flexibility is combined with a somewhat quirky interface.

Right-clicking on a compatible file, for example, always gives the choice of 'Play with VLC media player' but 'Add to VLC media player's Playlist' doesn't always show.

Stephen Withers

VLC is a versatile player with multiple codecs and capabilities. Keep it on hand.



6
10

XBMC 10.1

Try a media centre for video playback.

XBMC team ★
xbmc.org @
Free \$

'Lean back' UI; broad compatibility. ✓
Tends to take over the PC; no scrubbing control. ✗

XBMC is a different kettle of fish to the other programs reviewed here, being a descendant of an Xbox media centre – hence the name.

The interface is very much in the media centre 'lean back' tradition as opposed to the native (or, in the case of iTunes, Mac OS X) look and feel. This means relatively large mouse movements in ordinary use, and to navigate back up a tree you have to scroll up to the top of what may be a long list. A related inconvenience is the lack of an onscreen way to move XBMC out of the foreground. You have to press Alt-Tab on the keyboard.

XBMC does nothing in the way of library organisation – it's up to the user to add drives or folders to the menus. That's OK if you have a neatly arranged collection, otherwise it can be a tedious job.

On the plus side, XBMC handled all the non-DRM files we tried. It also plays online video content from a variety of sources, including YouTube

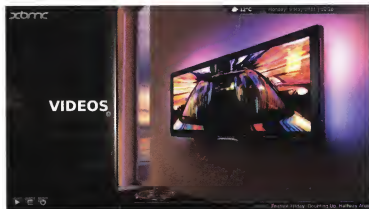
and TV sites in Australia and other countries via a range of add-ons. The look of the program can also be customised through the use of skins.

The onscreen controls appeared at the slightest mouse movement. We would prefer that only happened when the pointer entered the relevant part of the screen. And while the controls include fast forward and

reverse (up to 32x) there's no provision for dragging left or right to scrub through the video.

It's worth experimenting with the scaling methods for playback of lower-resolution videos. While the Auto setting generally gave the best result we sometimes found a manual setting that improved sharpness.

Stephen Withers



5
10

SMPlayer 0.6.9

Promising, but not ready for prime time.

The MPlayer Project ★
www.mplayerhq.hu @
Free \$

Some good user interface ideas; broad compatibility. ✓
We can see why it hasn't reached version 1.0 yet. ✗

SMPlayer is essentially a ready-to-run version of the open source MPlayer with a Windows user interface.

It handled all the non-DRM files we threw at it, and one user interface feature we particularly liked was the ability to scrub back and forth using the mouse wheel. The way the program remembers

where you were in a video could also be very convenient if your viewing is interrupted, and we also appreciated full-screen mode's compact control bar, which only appeared when the mouse was moved to the lower portion of the screen.

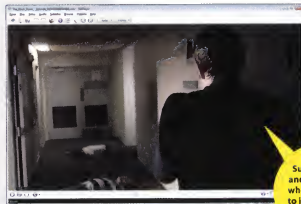
On the other hand, there were several user interface quirks. Changing a video setting such as rotate or applying a filter caused a paused movie to resume playing, and changes to Video Equalizer settings such as contrast and brightness registered on the status bar but had no visible effect on the image until we selected 'Use software video equalizer' in the preferences. The downside was that this setting resulted in video artefacts and we got

Sure, it scrubs and remembers where you're up to in your video, but it's far from the best.

The biggest problem we ran into was a pronounced lack of deinterlacing when playing DVDs created from footage shot on MiniDV. The default setting is no deinterlacing, so that wasn't surprising but whatever deinterlacing algorithm we selected, CPU usage rocketed and the disc stopped playing. This wasn't an issue with commercial discs, which gave a satisfactory picture with the default.

Subtitles included on DVDs were shown correctly, but we were unable to persuade SMPlayer to display a downloaded subtitle file for a recorded episode of a TV show. The documentation is patchy in many areas, including subtitles. We could find no reference to using subtitle files other than those downloaded by the program from **OpenSubtitles.org**, and that didn't work with any of the videos we tried.

Stephen Withers





Android apps

There's an app for pretty much anything you want to do. Here we take a look at our favourite Android ones.

Moon+ Reader

More options than you can shake a librarian at.

Free or \$4.50 - Moon+ > bit.ly/xj87R

With phone screens getting bigger, and Android tablets about to explode (not literally) onto the scene, now's a great time to start reading eBooks on your Android device.

My favourite eReader is Moon+ Reader. It supports txt, html, epub, umd, fb2, chm, zip and OPDS, but sadly not PDFs. You can forgive this when you see the app's customisability: you can change font type and size, line spacing, alignment, margins, orientation, background colour or image, and set up hardware buttons to trigger actions such as next page (perfect for volume keys), day/night mode, bookmarking, read-aloud and a host of others.

It also supports text-to-speech, online libraries, bookshelf-style browsing, page-turning animations, highlighting, annotation and dictionary lookup.

The free version is all most people will need, but there's a pro version available for \$4.50 that adds in multi-touch, headset and Bluetooth key control, direct-to-book homescreen shortcuts, sharing of annotations, highlights & bookmarks (great when switching between your phone and your tablet) and a 'shake to read' function.

That disposed of the opportunities for social life and I looked up kidneys and the Roman's brother produced some from his lot and I put a piece between two pieces of liver on a stick and started it broiling.

Copy Highlight Note Dict. Share

mincemeat.'

Then we had a long talk about the The Roman's brother produced some from his lot and I put a piece between two pieces of liver on a stick and started it broiling.

TripView

\$2.49 - Grosseft > bit.ly/tYdLK2

W Pennant His City			
Now	16:30	17:05	
	M61 - Caville Hill to City service		
2 mins	16:32	17:04	

TripView, while only available for Sydney, is a welcome relief from the 131 500 web site for public transport information.

You set up your predefined journeys by either clicking on your stop on a map or by searching for it by name. Once you've set these up, your next bus, train or ferry info is but a single click away.

Best of all, for those of us who are plagued with an unreliable data network, the app downloads the timetable info locally and notifies you whenever an update is available.

Cordy

Free - SilverTree Media > bit.ly/thrvx2



Cordy is like Sonic the Hedgehog for this century. I don't mean those tired re-hashes that have appeared on the Wii, but a genuinely fun, super-fast semi-3D platformer. I say semi-3D because it's really a 2D platformer that occasionally turns a corner. This is a good thing.

Run, jump, push, pull, lift, throw, and swing your way to victory. There are 12 levels included, and you can also purchase more through the wonders of in-app billing. Low-end devices need not apply. Go Cordy!

Widgetoid

Free - jaumard > bit.ly/teNars



There is arguably no more thorough a collection of widgets available in a single, free package than Widgetoid. It has 40 toggles, widgets for direct call/sms/email of a contact, or for quick access to any application, activity, or bookmark.

You can customise backgrounds, icons, colours, transparency, labels and indicator types, or even place the toggles in the notification bar so they're accessible from any application.

Also available is a \$1.30 donation version and a 70c alternative icons pack.



App Store

We've scoured the App Store and reviewed the best apps available for your iDevice.

Stork.cc

① \$1.19 • bobardoo.com • bit.ly/kGxJh

Extra! Extra! Extra!
Introducing Ballet Ducky



Duck and Goose are pleased to announce the arrival of a baby girl. Ballet Ducky was born at Dec 09, 2010 20:02 and weighed 1.

If you're expecting a child and want a corny yet memorable way to share the happiness and notify your friends and family when your little bundle of screaming, pooping flesh joy arrives, then Stork.cc has you covered.

The app will send out to selected contacts a newspaper-themed birth announcement, complete with all the details curious aunts and friends crave, as well as a photo, and some interesting facts about who shares the child's birthday and what happened on that day in history. Cute.

Unpleasant Horse

① Free • 4th & Battery • bit.ly/IC3PKq

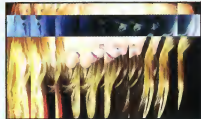


This game is the result of PopCap's first 24-hour game jam event, where employees created games based on a randomly generated name. 'Unpleasant Horse Racing in the Sky' translated to a game where you destroy your opponents by pushing them into the meat grinders below, while trying to stay aloft by grabbing feathers from passing birds and bouncing off of clouds.

Released under the 4th & Battery moniker, which PopCap use to release 'smaller, stranger, edgier game ideas', you can expect the playability of PopCap, without the family-friendliness.

Decim8

① \$1.19 • Kris Collins • bit.ly/k6C6SP



Always with the photography apps. A guy can only take so many Lomo filters before his head explodes. Thankfully, Decim8 is something a little different.

If a retro filter is supposed to emulate the faults and inadequacies of the analogue cameras of yore, then Decim8 is the warts'n'all digital equivalent.

By deliberately putting photos through a host of random 'bit-mangling' corruption filters, you can create images that reflect their digital heritage, rather than representing the now-dead days of film. Get with the times, man.

YumTable

Grab last-minute deals on food.

① Free • Madwell Enterprises Pty Ltd • bit.ly/PW4xy

If you're sitting there with a grumbly belly and a thin wallet, wondering if you should head down to the supermarket for a tin of beans and a loaf of bread, hold on a minute: cheap eating doesn't have to taste cheap.

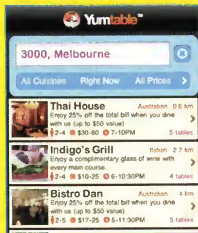
YumTable is a last-minute restaurant booking service that throws in deals to entice diners to fill empty seats. You can see what deals are currently active (and how far away the restaurant is), or you can filter deals by suburb, price range, cuisine or time of day.

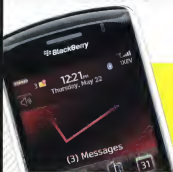
You can book your table from the app, saving you that embarrassing phone call, shouting over your grumbling tummy.

The app emails friends you'd like to invite, and the discounts happen behind the scenes, without the need for coupons, so you won't look like a tight-arse on that first date.

The service is fully available in Melbourne, and is rolling out nationwide now.

iPhone-less? You can do it all from www.yumtable.com.au too.





BlackBerry OS apps

Not to be outdone by the other stores, here we take a look at a selection of BlackBerry apps.

Xobni Super Address Book

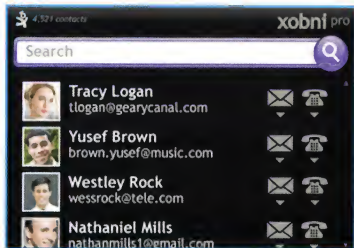
Super by name, super by function.

US\$1.99 (Pro) or Free (feature-limited) > Xobni Corp. > bit.ly/mcFLBg

Xobni's Super Address book is actually pretty super. It scrapes your email, SMS, calls etc. and creates entries for every person you've contacted, along with photos, contact info, emails, calls, texts, info from LinkedIn/Facebook and more. And, despite it being a separate address book, it makes them available from the compose screen.

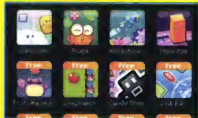
The address book itself is ordered by popularity of contacts, rather than alphabetically, meaning the people you contact most are the easiest to find. For those obscure contacts stuffed away at the lower end of the list, a speedy search function finds them in a snap. It even integrates with universal search for BBOS6.x devices.

The latest version now makes edits in your BB address book appear in your Xobni contacts. Pro users can also quickly export their Xobni address book to their BB address book. Xobni can also sync with Outlook or Gmail, keeping your BlackBerry in sync with them, and adding extra functionality. A Xobni Pro monthly subscription includes the BB Pro app, the Outlook and Gmail plug-ins and access to the Xobni Cloud. A monthly subscription is not required for the Pro BlackBerry App alone.



Playtomo

Free > C4MPROD S.A. > bit.ly/ishPdo



Playtomo is a marketplace chock-full of free, addictive mini-games, ranging from word games to puzzle games, with a liberal helping of action games, too.

With new games added every month, even the most A.D.D. of players will find something new to entertain them. And if you have friends who also own BlackBerry's, you can play against them via the magic of Facebook.

For such a fat stack of games, a few unobtrusive in-app ads are a small price to pay for hours upon hours of fun.

HiWiFi

US\$4.99 > i-Mentalist > bit.ly/6byDL



HiWiFi is a Wi-Fi hotspot manager for your BlackBerry that allows your device to automatically connect to any available open Wi-Fi hotspots, saving you from eating up your 3G data quota.

The app can run in either 'connect mode', described above, or 'watch mode', which compiles a colour-coded list of all the access points within range, for you to select and connect when you want to.

You can save your favourite hotspots for auto connection, and set an LED indicator to alert you when connected.

imgEdit

US\$1.99 > Toysoft Development Inc > bit.ly/i7YYZ



imgEdit is a feature-rich image editor for BBOS5 and above. It has the features you'd expect: rotate, crop, resize, zoom, flip, and mirror, and includes colour effects like greyscale, sepia, negative, interlace, paint, scatter and more.

It also comes with some advanced editing features, like modifying the RGB, HSB and brightness.

You can add freehand drawings, text or timestamps over the top of images, or add a frame to finish them off. It supports BMP, GIF, JPG and PNG formats.



Windows Phone 7 apps

A relatively new store, Windows Phone 7 Marketplace still has some great apps available.

Satalaunch

Free - Numeris - bit.ly/m5sbM4



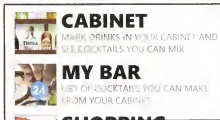
Attention intrepid space traveller! You must pilot an exploratory satellite to the distant planets. Survival depends on collecting stars on the way, but beware the many obstacles in your path!

You will eventually reach deep space, where you'll find black holes, nebulae, wormholes and other unknown terrors of a celestial nature.

Many unlockable achievements await you, as do special levels. Rewards for such danger are plenty, with the ability to create your own universes to share with your friends back home.

Cocktail Flow

US\$2.99 - Gergely Orosz - bit.ly/1cdh9v



You like drinks, I like drinks, so let's get together and have a drink - or two!

Oh noes! What to drink!? All I have in the cabinet is chartreuse and gin! Does that even work? Lemme check Cocktail Flow. Ah yes - let's grab some sweet vermouth and orange bitters for a Bijou. Lucky I have some glaze cherries lying around for the garnish!

Had I owned more alcohol, the list of possible cocktails would have been bigger, but I'm thankful for the 'Shopping' section letting me know what I need to make more.

À votre santé!

TuneIn Radio

Free - RadioTime - bit.ly/xCB6iw



The FM radio found in most WP7 phones is pretty groovy. You get to listen to Katy Perry, advertisements and wacky morning DJs. I love all those things.

Sometimes, though, you may want to listen to something a little calmer or more newsworthy. Whether that be on the AM band, or on FM waves that have no chance of travelling the several thousand kilometres from where they beam, TuneIn Radio will live stream your favourite show to your grateful ears via the power of RadioTime and magical wireless internet.

Shuriken Ninja

Destroy targets with bouncy shuriken.

Free - Clockwork Computing - bit.ly/mn3WmZ

With a title like this, you may be expecting a Fruit Ninja clone. Thankfully, it's far from it. Well, not far from it: they both revolve around ninjas hell-bent on destruction. But, unlike Fruit Ninja, our protagonist is much more considerate of all the starving children out there - thankfully he only destroys targets.

The idea is to hit all the targets on screen using the number of provided shuriken (ninja stars). The shuriken bounce when they hit metal, and you'll be forced to bounce them into a number of targets in a single throw in order to complete some levels. Not all the walls are metal, however, and the stars will stick into wood.

To make life difficult for our eternally practising hero, the targets don't always sit still. How they manage to move all by themselves in a pre-industrial society is probably beyond the scope of this review.

The game comes with 63 levels, and, if you fancy yourself a bit of a puzzle artisan, there's a level creator available



at the game's web site.

The software is free but ad-supported, which I don't have a problem with, as the ads sit unobtrusively up the top of the gameplay screen.

how it's done

TODAY'S TECH EXPLAINED



NFC: WALLET OR WON'T IT?

Near-field communication has the potential to streamline consumer experiences and more. **David Braue** explains the ins and outs.

Speculation about whether Apple would include NFC (near-field communication) capabilities in its rumoured iPhone 5 has been rampant, fuelled by growing interest in the technology.

Yet Apple is too late to claim first-mover advantage: devices including Nokia's 6131 NFC, SAGEM's my700X, Samsung's D500E, BenQ's T80, Sagem's Cosyphone, Google's Nexus S, Nokia's C7, Samsung's Galaxy S II, and RIM's BlackBerry Bold 9900 and 9930 all incorporate NFC capabilities, allowing them to read information from 'passive' tags or wirelessly communicate with other devices using an 'active' or 'peer-to-peer' mode. NFC support is built into the latest versions of two key mobile OSs (Android 2.2 and BlackBerry OS 7.0) and, if it's added to iOS 5, would become well-established on the key consumer platforms.

SHORT RANGE

NFC is a souped-up, more open version of existing contactless communications technologies, which long ago standardised on the ISO/IEC 14443 standard to facilitate interoperability.

These technologies include both contactless swipe cards used for building access control and other applications, and RFID (Radio Frequency Identification) tags used for security, asset tracking and other applications in agriculture, logistics and other industries (RFID is also governed by the ISO 18000-3 standard, with which NFC is compatible).

NFC works using magnetic induction: a reader emits a small electric current, which creates a magnetic field that in turn bridges the physical space between the devices. That field is received by a similar coil in the client device, where it's turned into electrical impulses to communicate data such as identification number,

status information and so on. 'Passive' NFC tags use the energy from the reader to encode their response, while 'active' or 'peer-to-peer' tags have their own power source and respond using their own electromagnetic fields.

Like RFID, NFC works in the 13.56MHz radiofrequency spectrum, using less than 15mA of power to communicate data over distances that are usually far less than 20cm. Tags typically store between 96 and 512 bytes of data and transfer data at 106, 212, 424 or 848Kb/s – enough to move small pieces of information virtually instantaneously, as is essential in high-volume transport applications.

NFC interfaces are defined in a pair of ISO and ECMA standards. ISO/IEC 18092 / ECMA-340 defines communication modes for NFC Interface and Protocol (NFCIP), setting active and passive communications modes and relevant modulation schemes,

codings, transfer speeds, frame format, collision control parameters, transport protocol and more; ISO/IEC 21481 / ECMA-352 defines NFCIP-2, which specifies communications modes to minimise interference with other contactless card devices.

Support for those legacy devices could help speed uptake of NFC: by offering backwards compatibility with ISO/IEC 14443 and Sony Felica-compliant contactless payment cards, the new devices can, when supported by appropriate software, interact with millions of existing card readers; indeed, NFC's 'card emulation' mode makes it look like a conventional contactless card. On a related note, some operators have explored the potential for adding de facto NFC support by equipping mobile SIM cards with ISO/IEC 14443-compliant chips, which will allow phones to run payment applications using existing physical infrastructure.

THE NFC ECOSYSTEM

The real value of NFC, however, comes not from its technical workings but from the protocols built around it. By setting standards and building layers of abstraction on top of core NFC functionality, smartphone platform vendors can give developers a rich set of interfaces for interacting with NFC.

For example, industry peak body NFC Forum (www.nfc-forum.org) has been filling out the NFC family (www.nfc-forum.org/specs) with protocols like NFC Data Exchange Format (NDEF), which allows the storage and communication of binary documents including MIME objects (images, PDFs and so on), URLs and other details. NDEF record types specify whether the object is a Smart Poster, Text, URI, Signature, Generic Control, or a handover control specification, with Service

ANZ have had a positive response, while mobile communications peak body the GSM Association (GSMA, at www.gsmworld.com) is promoting takeup with its Mobile NFC specification, Pay-Buy-Mobile payments approach and the ISIS specification (www.paywiththis.com) to provide a single global mechanism for NFC payments.

Proper functioning of an NFC application depends on a vast array of interconnected systems to receive, process, store and audit transactions – and this is where NFC has struggled in the past. Another enemy is inertia: contactless systems will only really take off with widespread support from financial services, public transport and other bodies. And, paradoxically, the only way

RIM's BlackBerry Bold 9900, Nokia's C7 and Samsung's Galaxy S II are among a number of recent phones to add NFC.



NFC-EQUIPPED MOBILES CAN ACT AS VIRTUAL WALLETS, HOLDING BANKING, LOYALTY PROGRAM, PERSONAL PREFERENCES AND OTHER DETAILS

Discovery Protocol, IP, OBEX and SNEP bindings allowing links to other types of objects.

NFC's rapid and promiscuous communication has made it well-suited for public transport, where the ability to quickly read ticket information has made it a staple in countries like Singapore, Japan and the UK; NFC is also used in Victoria's struggling Myki program. In Europe, the transport industry has already converged around the interoperable Calypso (www.calypsotechnology.net) contactless ticket standard.

Point-of-sale transactions are also possible through NFC, with services like Mastercard PayPass eventually likely to allow NFC-equipped mobiles to act as virtual 'wallets' holding banking, loyalty program, personal preferences and other details. That's a very high-security application, so banks will drive those rollouts at their own speed.

Early trials at Westpac and

those bodies will support NFC is if there are enough consumer devices in the field to justify investing in ecosystems.

It's still a leap of faith few are ready to take: a recent tender for a multi-use NFC infrastructure issued by Singapore's Infocomm Development Authority specified that providers could expect to kit out 4,000 merchant locations to service just 30,000 subscribers two years into the program, expected to go live early in 2012.

Little wonder pundits are excited about NFC-enabled smartphones: once everybody has one, there's more reason to invest in workable ecosystems – and for developers to utilise NFC in ways that have nothing to do with payments. For example, smart commercial signage can transfer promotional details to a phone held momentarily against a poster or product tag. Or an interactive museum tour can provide audio narration.

Such applications shine when compared to Bluetooth, since they don't require pairing. NFC is even being tapped as a way of speeding the pairing of Bluetooth devices by automatically exchanging authorisation keys. Such 'tapping' or 'bumping' actions are also being explored as drivers for social applications, such as a Nokia-led partnership with Angry Birds developer Rovio that will see a version of the game that allows certain levels to be unlocked when two NFC-equipped Nokia C7 smartphones are tapped together.

This type of functionality would also enable the easy exchange of business cards and other personal information – a practice that has been stymied by Bluetooth's ponderous pairing processes. Where developers take this technology is anybody's guess, but they now have free rein after toolkits such as the free libnfc provide interfaces for

NFC devices, and Google's Android 2.3.3 update added enhanced NFC capabilities.

Pyramid Research has predicted sales of 250m NFC-capable smartphones – 28% of all devices sold – by 2015. Progress towards this target is being hastened by an increasingly visible role for industry peak body NFC Forum, which recently welcomed Google as a principal member and adding 31 members to bring its membership to 135 companies.

The group also launched N-Mark, a certification program to indicate tested compliance with NFC standards and is intended to become a universal symbol for NFC capabilities. Given a few years, efforts to standardise the NFC experience across devices and platforms should usher in an entirely new era of mobile payments and long-promised smartphone 'wallet' applications. bit.ly



masterbuilder

HOW TO BUILD THE ULTIMATE PC



One of the joys of computing is building your own PC from a collection of parts you've recently chosen yourself, then naming a Master Builder who configures a PC to a specific need and purpose, recommending the best components for the job.

Extreme Gaming PC (within reason!)

Adrian Rundle likes to build hardware that pushes the limits – but sticks to a sane budget.

Adrian (ss-rotel) Rundle is an IT professional who does everything from building computers to setting up Windows Server and Linux-based network ecosystems. Most of all, he loves to build PCs and push them beyond

their recommended 'safe' factory limits.

Naturally, gaming PCs are among his favourites, so we've asked him to build an Extreme Gaming PC, "within reason". That is, something that will play *Crysis 2* with ease

but is not insanely expensive. "This machine is designed to make your friends drool (and call you names)," Rundle says. It's not cheap, but from here the only way to get faster is to spend two to four times as much money."

CORE SYSTEM

SYSTEM COST
\$3,110

CPU

Intel Core i7 2600K - \$359

Awesome overclockability, great price and since only the socket 1366 Core i7 990X can beat it in speed (once overclocked), would you really want to pay more than four times the price? This processor has a theoretical overclocking limit of 5.7GHz.

COOLER

Corsair H60 - \$109

An upgraded version of the Corsair H50/H70 water block. With a new pump, it has all the things that make this cooler as efficient as the H70 but almost 3dB quieter than the H50.

The radiator has a provision for the addition of a second 12cm fan.

MOTHERBOARD

GIGABYTE GA-Z68X-UD5-B3 - \$349

GIGABYTE's the first to bring out the new Intel Z68 chipset to Australia. This chipset features SSD caching, which, as its name suggests, speeds up reads seamlessly without sacrificing storage space (you only need a 20GB SSD to make this work), and Quick Sync, which will let you access the GPU on the chip for multimedia encoding and decoding.

GRAPHICS

GIGABYTE Radeon HD 6990 4GB - \$839

The difference between the GTX 590 and the HD 6990 comes down to which games developers decide to optimise for the respective GPUs. Differences are within 5fps max, and even though the GTX 590 might be a little faster on average, it's also more expensive. Bang-for-buck, the AMD card (HD 6990) is the better option.

MEMORY

Corsair CMT4GX3M2A2000C8 4GB (2x2GB) DDR3 - \$398 (\$199 each)

Corsair's ultra-high performance 4GB DOMINATOR-GT kit. It's fast (2,000MHz), has tight timings (8-9-8-24) and good voltage handling (1.65V). It's perfect for overclocking and it comes with a fan, which will be handy as we're using a water-cooling setup.

HARD DISK 1

Western Digital Caviar Black 2TB - \$179

The SSD caching option doesn't work if you plan to run a RAID array. So just choose the biggest and fastest HDD out there. Pretty sure this is it.

HARD DISK 2

OCZ Vertex 2 60GB SSD for SSD caching - \$149

SSD caching option – yoi Benchmarks don't show an increase in boot times, but in most cases write times are better and read times increase markedly once the machine's on for a spell.



GIGABYTE's GA-Z68X-UD5-B3 motherboard, complete with SSD caching and Quick Sync.

Hard disk 1 is the OCZ Vertex 2 60GB SATA II 2.5in SSD — for SSD caching.

Adrian Rundle pushes the boundaries with a fast and powerful gaming system.

Hard disk 2 is the megabig and megafast Western Digital Black Cavalier 2TB.

EXTRAS

Rundle has focused on the system, so we've picked APC's favourite extras to go with his build.

MONITOR

BenQ XL2410T

The gaming monitor of choice. Has a 120Hz refresh rate, LED backlighting, 2ms response time and heaps of gaming modes.

KEYBOARD

SteelSeries 7G

Last month's Pro Builder Todd Place chose this one for his set-up, and we agree heartily. A purist's keyboard. Has gold-plated no-click mechanical switches for extremely low latency and gaming grade lifetime of 50 million strokes.

MOUSE

Logitech G500

Gaming Mouse

Another obvious choice. This mouse has a precise gaming-grade laser, adjustable sensitivity and even weight tuning (in which you can add up to 27g of extra weight to get the heft and balance just right for your game).

OPERATING SYSTEM

Windows 7 Home

Premium 64-bit

All you need for gaming.

OPTICAL DRIVE

Samsung SH-B123A Blu-ray combo reader — \$89

People don't really use optical drives all that often, but at this price why wouldn't you opt for a Blu-ray reader?

POWER SUPPLY

Corsair AX950 — \$275

As long as you read up on how much current draw your system needs, and as long as you don't skimp on the price, the PSU you decide on is basically personal preference. As the Corsair PSUs are made by Seasonic (whose own-branded PSUs are arguably one of the best in the world) you can't go wrong. That or an Enermax, if you can find one.

CASE

SilverStone Raven RV03 — \$169

SilverStone has rethought the design of the Raven case, reducing its depth dramatically (if you've ever seen an RV01/02 in the flesh, they are huge). This in turn has reduced the

amount of metal needed, reducing the cost of an already excellent-value case.

CASE FANS

3x Noctua NF-S12B FLX 12cm fans — \$105 (\$35 each)

Replacing the fan on the Corsair cooler with one of these Noctuas will drop the noise to about 22dB (over the 29dB stock). Adding one to cool the video cards and one for the HDDs will compensate for the slight drop in air movement (70 CFM down to 55 CFM). At that level, if the system sat under the desk, it would be basically inaudible.

The reduced-depth SilverStone Raven case is less costly than its predecessors.



BEGINNER'S GUIDE

Unlocking Sandy Bridge's potential

A beginner's guide to overclocking the new 2nd Generation Core Processor, by **Bennett Ring**.

Why do so many PC users still pay top dollar for their processor? The Intel i7 980X processor is currently retailing for a bank-busting \$1,300, yet with just a few BIOS changes, the much cheaper \$200 Intel i5 2500K processor can be tweaked to wipe the floor with the more expensive chip. Intrigued? You should be, and we're going to show how to upgrade to an i5-powered, 4.5GHz monster for just over \$500 and without any technical expertise.

RECYCLING THE OLD

We're assuming you already own a PC built sometime in the last century so aren't starting from scratch. You'll need a PC case that can handle an ATX motherboard, preferably with a couple of empty case fan holders. A decent PCI-E graphics card will come in handy, but if you're a serious gamer you'll find anything slower than a GTX 460 will be a serious performance bottleneck once your new supercharged CPU is installed.

If you're looking for the ultimate overclock, a high-quality power supply can extract a few extra MHz, but anything around the 600W range should be fine for our

moderate mid-4GHz adventure. DDR3 memory has become the norm in the last few years, and you'll be populating your new motherboard's memory slots with a couple of sticks of this type. Your new motherboard can run the memory at speeds of 2,133MHz, but we're not going to overclock the memory at all. It is possible, but it's best left to the pros with plenty of patience, looking to eke out additional yet incremental performance.

Dust off your old DVD-ROM and hard drives as they'll do the job nicely for your new PC, provided they're equipped with SATA ports. If you're still using IDE-nosaurs, you'll have to spend another \$100 or so to upgrade them.

IN WITH THE NEW

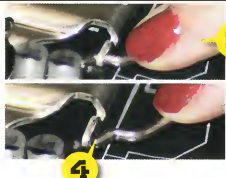
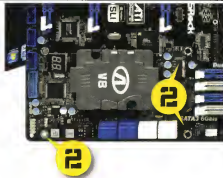
The core component for your new system is a suitable motherboard that supports Intel's new Socket 1155, and is known as a solid yet simple overclocker. We've chosen the ASRock P67 Extreme4, a mid-range motherboard that's regarded in overclocking circles as a solid first choice for beginners. It'll set you back around \$180 if you shop around.

Our CPU weapon of choice is the 2nd Generation Intel Core i5 2500K. The k in the product name is of crucial importance, as

it signifies that the CPU is multiplier unlocked, a vital feature for overclocking. Expect to pay \$200 for this chip.

Keeping it cool is the ever reliable Noctua NH-D14 heatsink/fan cooler. We've benchmarked this massive slab of aluminium in the past, and love the way it can tame even the hottest chip without raising the dead, staying nice and quiet as it beavers away. It's so big that it hangs over the first two memory slots on the motherboard, so you won't be able to use memory sticks with towering heat-fins, something to bear in mind if you're also buying new memory. Cheaper heatsinks benefit from third-party thermal paste, but Noctua includes a tube of its own high-quality paste in the pack. Just make sure you buy the latest version of the NH-D14, which includes the necessary bracket for the Intel Socket 1155. This cooler isn't cheap, at \$100, but it's worth it for the performance increase of your CPU.

A good heatsink fan can perform only as well as the air it's being fed, so our final components are a couple of cheap 90mm case fans. Look for fans that specialise in quiet performance, with the Arctic Cooling F9 Pro an affordable yet silent option.



PUTTING IT ALL TOGETHER

Before we install the new components into your PC, we need to gut the old gear. Keep the PSU, hard drive and DVD drive in place, but detach every cable from every component, and put to the side. Using a Phillips head screwdriver, look for the screws on your old motherboard attaching it to the PC case, and remove them.

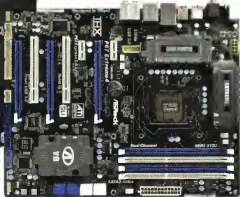
Once the motherboard is out of the way, you should see brass risers extending from the part of the case that it was attached to.

1 These lift the motherboard away from the case, and prevent electrical short circuits. If you've got a brand new case without these installed, screw at least six of these brass risers into the case, lined up with the mounting holes on your motherboard, which are lined with insulating metal. Using a brush, flick out the years of dust and gunk that have undoubtedly gathered in the case.

Installing a heatsink onto a motherboard can be a knuckle-dragging affair, so save yourself the trouble by installing it onto the motherboard before you put it in the case. Take the motherboard out of its packaging and open the Socket gate where the CPU goes by pushing down gently on the lever on one side, moving it sideways free of the latch and then lift it upwards. 4 The entire top layer of the socket will now swing open, allowing you to remove the plastic pin protector (it's not present in our pre-used motherboard). 5

Place the CPU gently on top of the pins, ensuring the two indentations on the edges of the CPU match up perfectly with the jam lugs on the socket. It's very important that you match the indentations up correctly – if you don't and try to close the socket, you may bend the pins in the Socket, which requires a repair job from the manufacturer. 7 It's easy to check though, as there's only one way that the CPU can be seated correctly. Once it's in

Unlock your CPU's full potential with just a few BIOS tweaks!



place, gently close the gate before pushing the locking lever outwards, down and back into place. The entire process shouldn't need any force at all and will result in your CPU locked snugly in place. Place your memory in the memory slots, making sure they're both in the same coloured slot (put both in blue, or both in white – not one in each).

Following the instructions in the Noctua pack, attach the rear heatsink mount to the rear of the motherboard. Put a pea-sized drop of the Noctua thermal paste on top of the CPU, then spread it evenly across the CPU using a business card or similar. This isn't like coating a piece of toast with your favourite jam – it should be a very fine, thin layer of paste. Then, following the Noctua instructions again, build the top layer of the heatsink mount. Fear not, if you've built even the simplest LEGO kit this will be child's play. Place the heatsink on top of the CPU, and screw down the two mounting screws.

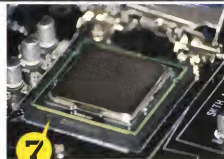
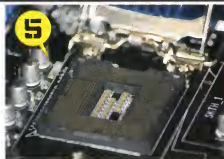
Now that the CPU and cooler is in place, we're just about done. It's time to install the

entire contraption into your case. Put the motherboard's I/O shield into the case, facing the rear in the large area where you expect the motherboard's USB, Ethernet and other ports to line up. Put the motherboard down into the case, before pushing it backwards into the I/O shield. In the process you should see the holes in the motherboard line up with your brass risers. Screw the motherboard down into place, using short Phillips head screws. Once it's firmly in place, it's time to plug in the PSU's power cables, your hard drive and DVD's SATA cables, and finally the case's power and reset plugs.

Last but not least, it's time to get the air circulating in the case. Install one fan at the rear of the case, pointed so it's sucking air into the case and onto the CPU. The other case fan should go at the top of the case, blowing the hot air that congregates there outwards.

Now we've got all the hardware in place, we'll change a couple of options in the BIOS to unleash your CPU's potential. Check back next issue to find out how... [\[7/10\]](#)

CHIPER CHIPS RULE – YOU'LL SOON BE WIPING THE FLOOR WITH THAT EXPENSIVE CHIP





IS LINUX FINISHED?

People are quitting Windows, but not for open source: they're embracing OS X. What's left for Linux? **Gary Marshall** investigates.

Since the turn of the century, pundits have been telling us that this will be the year of desktop Linux – but while the open source operating system has made significant inroads into the server and mobile markets, desktop market share is much the same as it was a decade ago: about 1%.

Netbooks gave Linux a short-lived boost, but the world of PCs still largely belongs to Microsoft – with one Unix-spun exception. Apple's Mac OS X is doing what Linux advocates long dreamed of – it's actually taking market share from Microsoft. Can Linux learn anything from Apple, or does open source need its own Steve Jobs? In short, can Linux win?

SIMPLY THE BEST

Linux's mission was simple: to make the world's best desktop OS. If you didn't like Windows, Linux was waiting with open electronic arms. Eventually consumers would realise that Linux was a platform where malware, spyware and other irritants weren't a factor. A platform designed to bring man and machine together in harmony. There was a problem though: those consumers bought Macs.

The numbers are staggering. Apple's Unix-derived Mac OS X was shipped on 1.99 million Macs in the third quarter of 2010, according to IDC. That gave Apple an unprecedented 10.6% of the US PC market. Year on year, Apple's sales are up 24% compared to just 3.8% for rest of the industry, and that figure doesn't include iPads or other iOS devices. Why Macs and not Linux?

Michael Silver, Research VP and Distinguished Analyst with Gartner, explains: "No, Linux didn't become big on the desktop, and yes, Apple does appear to be causing Microsoft more problems [than Linux] these days. I think this underscores the issue that cheaper doesn't solve problems. Organisations are looking for solutions that provide value and solve their problems, and desktop Linux



Many consumers have abandoned Windows, but in most cases they're buying Macs instead.

doesn't really do that when you have Windows and Office – read Microsoft Office – to run.”

As Silver points out, there's a growing trend for users to influence the choice of computers they're given, “and while most can't officially select their platform yet, users want devices they perceive as increasing their productivity. And most would rather drive a luxury or sports car (the Mac perception) than an economical car (their perception of Linux). Linux still has a perception of being unapproachable, and it doesn't have the marketing budget to buy the cachet that Apple does.”

OSs AREN'T INTERESTING

To most people, operating systems simply aren't interesting – they would no more change their PC's OS than they would change the engine in their car. Because of this, Linux faces an exceptionally difficult situation: to get significant market share, it needs to be pre-installed on shipping PCs. Unfortunately,

to be pre-installed on shipping PCs, it needs to have significant market share. Catch-22.

In recent times, Dell is the only major PC vendor to throw its weight behind Linux. Although, the Linux HP desktop will be shipping its own WebOS, which uses the Linux kernel. HP acquired it when it purchased the smartphone maker Palm. In March, HP CEO Leo Apotheker told Bloomberg Businessweek that from 2012, “Every one of the PCs shipped by HP will include the ability to run WebOS in addition to Microsoft Corp's Windows.” Apotheker says that WebOS will “become a very broad and very massive platform,” shipping on 100 million devices per year.

Can Linux thrive if more OEMs offer it? Gerry Carr, the Director of Communications with Canonical, the creator of Ubuntu (www.ubuntu.com), says “PC manufacturers will not solve all, or any, problems

by shipping Linux. PC manufacturers will ship what their customers are asking for. We haven't generated sufficient directed and determined demand in a broad enough mainstream market to convince them to [ship Linux] in great numbers. I don't think it's going to be a supply-led revolution. It needs to be demanded, and we'll be spending considerable time boosting that.”

Canonical thinks it has the solution to mainstream users' lack of interest in desktop Linux: make something that's as attractive as, or more attractive than, Mac OS X or Windows 7 – to borrow Michael Silver's analogy, make a sports car rather than a Yugo. Canonical calls its sports car Unity.

While firms such as Dell promote Linux on high-end and enterprise kit, their range of Linux-powered consumer PCs can be rather small.

UNITE & TAKE OVER

Unity is the new interface for Ubuntu, and it's a deliberate attempt to bring good looks and user-friendliness to a platform that



HP's Linux-based WebOS will initially ship on tablets, but it's coming to desktop PCs too. HP predicts 100 million WebOS devices per year.





Google's Chrome OS is due to ship this year, but there are doubts.

Android's killer combination of impressive hardware and a powerful OS is putting Linux in millions of pockets.



isn't exactly famed for its fantastic user interface design. It's proved controversial; it was developed in-house, not by the wider community, and it's very different from earlier versions of Ubuntu and other GNOME-based distributions. By betting the farm on Unity, Canonical could alienate some of its existing user base in the hope of attracting lots of new users.

It's the Apple model: instead of asking customers what they want and then trying to meet every single request, Apple simply creates what it thinks works best and then releases it. "You can't just ask customers what they want and try to give that to them," Steve Jobs said in 2005. "By the time you get it built, they'll want something new."

It's a big risk, but Gerry Carr for one is bullish. "We're trying to do something that has never been done before," he says. "We've taken the evolution of Linux as a

mainstream OS further than anyone else; by any reasonable estimation, it's already the third-biggest OS in the world. Unity gives us the chance to arm [users] with a look, feel and experience that will enable them to convert other users to the benefits that they enjoy. I think it will be the first time you have someone who looks at a Linux-based OS, if you want to describe it that way, and see it on looks alone as something they want to use. That's a true first and we think it has the potential to shift the market."

Canonical isn't the only firm that thinks a more user-friendly Linux could be a big deal. Google has Chrome OS, a Linux-based OS for netbooks, which is due for release this year. However, Gartner's Michael Silver isn't impressed by Google's promises so far. "We believe there's a good chance Chrome OS won't get released," he says. "With Android doing well and showing up on tablets, the reason for Chrome OS's being is questionable."

understatement – that "Linux is doing quite well." According to Canalis, in Q4 2010, one in three smartphones ran Android. Google's platform had 32.9% market share, Nokia 30.6%, Apple 16% and RIM (BlackBerry) 14.4%. Microsoft trailed behind with 3.1%.

Android is growing in the tablet market too. Apple's market share has gone from 95% to 75%, and most Android-powered rivals have yet to ship. Strategy Analytics (www.strategyanalytics.com) predicts that Apple's tablet share will drop below 50% by 2013, with Android doing most of the damage.

The mobile market is very different from the PC market, and Android owes its success to those differences. Windows isn't dominant on mobiles, and Android isn't a software-only proposition: Google doesn't have to persuade people who buy an HTC Desire HD to switch OSs, because the HTC ships with Android pre-installed. In fact, you could argue that Android is mainly about hardware; you choose Android because of the device first and the OS second.

RISE OF THE ROBOTS

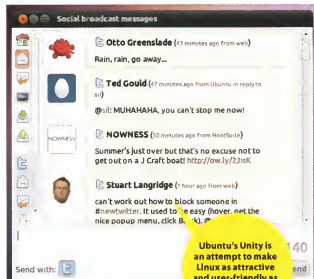
Can Linux win? In the form of Android, it's winning already. Smartphones now outsell PCs, and as our computing becomes increasingly mobile, we're more likely to use an Android device than a Windows one.

"I agree, a traditional desktop is becoming less and less the primary computing environment people interface with," says Amanda McPherson, Linux Foundation's vice president of marketing and developer programs, adding – with some

FALSE DAWNS

Android looks as if it could represent the ultimate triumph of Linux over Windows, but we've been here before and it didn't end well. For a while, netbooks seemed like the Trojan horse that would let desktop Linux sneak into the mainstream. In 2007 and 2008, netbooks ran Linux. Windows XP was being retired and Vista was too big and costly to be worthwhile on cut-price machines. By the end of 2007, ASUS had shipped around a million Eee PCs, all running a customised Xandros Linux. Other manufacturers followed: Acer with Linpus Lite, Dell with Ubuntu, HP with SUSE and so on.

It wasn't long before Microsoft noticed, and with Windows 7 some way off, it hastily resurrected Windows XP and offered PC companies big discounts. By December 2008, nine out of 10 netbooks on sale were



Ubuntu's Unity is an attempt to make Linux as attractive and user-friendly as its big-budget rivals.



ASUS's EP121 Slate is one of the few tablets to ship with Windows.

Linux had a near 100% market share on netbooks in 2007-08. Now most such devices are supplied with Windows 7 Starter Edition.

running Windows; today, most shipping devices run Windows 7 Starter Edition.

What happened? Lenovo's Matt Kohut reportedly said: "There were a lot of netbooks loaded with Linux, which saves \$50 or \$100 or whatever it happens to be... [and] there were a lot of returns because people didn't know what to do with it. Linux, even if you've got a great distribution, still requires a lot more hands-on than Windows. So we've seen people wanting to stay with Windows, because it just makes more sense - you take it out of the box and it's ready to go."

There are several reasons why that bit of history seems unlikely to repeat itself, though. Firstly, and perhaps most importantly, Microsoft doesn't have a familiar OS it can resurrect to fend off the Android horde: Windows Mobile never had the traction that Windows had on the desktop, and by the time Microsoft canned it in 2010, it was looking hopelessly outclassed.

The new Windows Phone is a vast improvement, but OEMs aren't embracing it the way they did Windows on netbooks - and Windows Phone's market share is falling, not rising. According to ComScore, Microsoft's share of the US smartphone market dropped from 9.7% to 8% between October 2010 and January 2011. Microsoft claims to have shipped - not sold - 2 million Windows Phone devices during that period, but so far at least it doesn't appear to be stopping the decline in Microsoft's mobile market share.

The much-hyped deal with Nokia to make Windows Phone the Finnish firm's platform of choice may address that, but not in the short term: the first Nokias running Windows Phone may not arrive until 2013. By then, Android could well be dominant.

TAKING TABLETS

If things look bad for Microsoft in the mobile market, tablets must be making it downright

miserable: as with netbooks, the rise of the tablet appears to have taken Microsoft completely by surprise, and there isn't an OS to put on them. With the exception of a few devices like ASUS's EP121 Slate, firms are choosing Android to compete with Apple. Microsoft is working on a tablet OS, but it isn't due until 2012.

If you take the smartphone and tablet markets together, you'll see that traditional roles have been reversed. Here Microsoft is the minority player, and most of the mobile market is split between two Unix-derived OSs: Apple's iOS and Google's Android.

That's unlikely to change in the short term, and it could have long-term effects too. "I think these changes have made people aware of a couple of things," Carr says. "First, that the choice of OS matters - this awareness is on mobile devices, not necessarily PCs - and secondly, that the choice need not be provided by Microsoft. That's critical to opening up the world to some genuine competition based on quality of the computing experience, not ability to dominate the supply chain."

That doesn't mean Android's success will necessarily translate to desktop computers, though. "I've been surprised by how little bleed there's been from the mobile devices to the fuller PC experience," Carr says. "Android's success on smartphones doesn't pre-suppose success on netbooks, for instance. The main driver of that will be marketing and delivery [...] the success or failure of WebOS as an instant-on product, Chrome as a cloud netbook OS or Android as a phone OS will have little effect on the success of Linux or any other OS in the core PC market [...] we aren't going to get a free ride onto people's primary machines because of the choices they've made on their tablets and phones and other devices. We still have to work hard to convince

users and the industry of the value of an alternative."

The success of Android and iOS could help desktop Linux indirectly, though. Smartphones and tablets are helping usher in what Steve Jobs calls "the post-PC era", where always-on mobile devices connect to the cloud. The growing capability of HTML5 and runtimes like Adobe AIR mean the underlying OS is becoming less important.

"Android, Chrome OS and WebOS tablets running Linux are poised to become an important part of the 'desktop' equation," McPherson explains. "It just may not look like what we today consider to be the desktop."

THREE SCREENS

Microsoft's vision of 'three screens and the cloud' is nearing reality, although those might not all be Microsoft ones: provided your browser can handle HTML5, it doesn't matter what the underlying OS is.

"I think there'll be a range of low-cost, small-screen PCs that will be popular, emerging on a range of architectures," Carr says. "I think there'll be a critical mass of Linux use as a technology that will bridge mobile devices, PCs and cloud computing."

That won't be a single flavour of Linux - it'll be a cocktail: Ubuntu on a desktop, Android on a tablet, a sprinkling of WebOS and a dash of Chrome OS too. "The platform environment today isn't a zero sum game," McPherson says. "Since Chrome uses Linux, if Chrome does well it benefits the Linux platform - just like Android or WebOS. Since Linux is used in so many ways by so many companies and projects, it doesn't make a lot of sense to focus on one application."

The future of Linux is on tablets, smartphones, PCs and perhaps devices still deep in development. "This is desktop Linux," Carr says. "It's just that our desktops will work and act differently." □ □ □

JAVASCRIPT UNCOVERED

Since 1995, JavaScript has helped transform the internet.

Julian M Bucknall looks at why and how.

Pretty much wherever you go online, you'll be using a web page with some level of intelligence behind it. It may be as simple as registering the fact that you're viewing the page, it may be tracking your likes and dislikes, or providing an animation to make the experience of viewing the page better and more interactive. No matter what's happening under the hood, it's most likely JavaScript code that's doing the work.

PROJECT MOCHA

Back in 1995, Netscape hired Brendan Eich, then at MicroUnity Systems Engineering, to help out with a new project called Mocha for the next version of the Netscape Navigator browser. Sun Microsystems had only recently launched Java applets – little programs that could run in a browser – but it needed some kind of 'glue code' for the browser to allow them to run. Eich decided that a simple script language would be the answer, because he realised that in all probability it wasn't going to be programmers creating a web page with Java applets, but web designers.

Those designers would be using Java applets as black boxes they would need to easily tie in to the page. He started work on a loosely typed interpreted language he eventually called LiveScript. Since his intended users weren't programmers, he avoided standard development niceties like compilers and a formal object-oriented system, and made the language forgiving of minor mistakes that a more formal language

would signal as errors and refuse to run.

He also added hooks for code written in the language to interact with the page's HTML markup so designers could manipulate forms, images and the like.

Just before Sun Microsystems and Netscape announced the new language in December 1995, it was renamed 'JavaScript' in a marketing attempt to more strongly emphasise that its purpose was to host Java applets. This was, to put it mildly, disastrous: JavaScript is not Java and, apart from some superficial syntactical resemblances, doesn't work like Java. This naming decision has led to more problems for programmers than any other, because they have the expectation that the 'Java' in JavaScript means the Java they're used to using on the server side.

The decision was also a disaster because web designers and programmers pretty much ignored Java applets, and instead used JavaScript to manipulate elements on the page (and it must be said, in the early days it was mostly image swapping: the rendering engine in the older browsers wasn't up to the task of rendering dynamic elements quickly).

Since there was no need for a compiler, coupled with the fact that you could copy and paste scripts from other sites into your own with pretty much no change, and that testing a script was so easy (just load the page, essentially), it meant that JavaScript took off to an astonishing degree. 'Real' programmers dismissed it as a toy at first – the ZX81 of the web – but it soon became ubiquitous, especially once Microsoft got in on the game.

MICROSOFT WADES IN

Microsoft's response was typical of the time: it released a scripting language based on Visual Basic called VBScript. It was strongly tied to Internet Explorer, and to Windows. Since that wasn't to everyone's taste (Netscape Navigator was winning the browser wars at the time), Microsoft introduced its own version of JavaScript, called, for trademark reasons, JScript. JavaScript was a trademark of Sun Microsystems at the time, and is now owned by Oracle Corporation. The problem was that Netscape ruled the browser space, and was notorious for introducing new features and options quickly and assertively.

From that era we have JavaScript itself, as well as cookies, frames and poorly thought-out HTML markup (who could forget the 'blink' attribute?). Until IE3, Microsoft was playing catch-up in the JavaScript space.

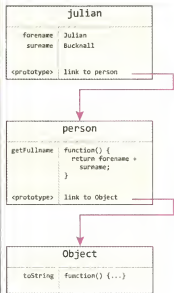
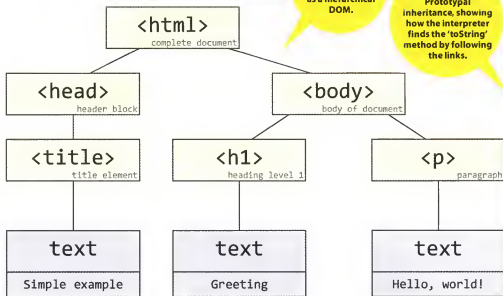
Eventually, with the push from IE3 users, Netscape and Sun were forced to seek the help of the European Computer Manufacturers Association (ECMA) to standardise the language, so web developers and designers would have some hope of writing code and running it without changes in the big two browsers. That led to the ECMAscript standard in 1997 (the third version of which, published in 1999, lasted for some 10 years). Yes, JavaScript is also known as ECMAscript.

DYNAMIC HTML

The next problem to afflict JavaScript and the browser space was Dynamic HTML

FIGURE 1:
A simple web
page represented
as a hierarchical
DOM.

FIGURE 2:
Prototype
inheritance, showing
how the interpreter
finds the 'toString'
method by following
the links.



(DHTML) and the Document Object Model, or DOM. When Netscape and Microsoft released version 4.0 of their browsers, they added better access to the attributes and elements of a web page. This access was made through a library known as the DOM, a hierarchical tree data structure that represented the web page as a set of objects, where some are siblings to others and yet others are children (or alternately, parents) to other elements.

Figure 1 shows a simple HTML document represented as a DOM tree. In it, you can see the 'head' and 'body' elements are siblings, whereas the 'h1' element is a child of 'body' (therefore 'body' is the parent of 'h1'). The text nodes at the bottom are also part of the DOM, albeit not exactly as HTML elements.

Unfortunately, although the general ideas about hierarchy and the DOM element names were common across IE and Navigator, Microsoft and Netscape differed on how attributes of elements were to be accessed. Although everyone was now pretty much in agreement about how the scripting language worked, using it with DHTML proved to be a nightmare – one that's still with us today.

Anyone who has written cross-browser JavaScript code knows the weird broads of incompatibility between the browsers' DOM. When Internet Explorer and Netscape 4.0 came out, you could soon get libraries that tried to make Netscape act like IE, and vice versa. Other developers released libraries that encapsulated the commonality between the DOMs, though that generally meant forsaking some of the better parts of each DOM.

This split between the DOMs led to sites that worked well in one browser and less so in the other. The browser was intensified as Microsoft, Netscape and others, together with the web standards body, the W3C, tried to standardise the DOMs. The process was lengthy, and, slowly but surely, Microsoft's Internet Explorer became the pre-eminent browser. Since IE was delivered as part of Windows, it also led to the monopoly trials against Microsoft, and the rise of the Mozilla and other browsers like Firefox and Opera.

JavaScript itself stayed pretty constant throughout this period of entrenchment and consolidation since the third edition of ECMAScript (which everyone was using)

proved very stable. There were high hopes for the fourth version of JavaScript, including a 'proper' object-oriented class model, but in the end the plans proved too ambitious and they were dropped for a simpler fifth edition – ECMAScript 5 – which is being integrated into the browsers' interpreters (Firefox 4 and IE9 both support ECMAScript 5).

WHAT'S SPECIAL

JavaScript derives its syntax from the C family of languages. For example, it has the structured C-style 'if', 'while' and 'for' statements. This also means that JavaScript is an imperative language (the programmer has to explicitly state how the work is to be done, compared with a declarative language where the programmer states what the outcome is to be). As with C, statements are terminated by semicolons – although, unlike C, you can leave them off (JavaScript has a feature called automatic semicolon insertion).

The first thing that strikes most people about JavaScript is that it's dynamically typed. This means that variables don't have any intrinsic type attached (like 'int' or 'string').

ACTIONSRIPT

In the late '90s, Macromedia was trying to push its Flash product for media playing on the web. At the time, there was a limited API for interacting with the media, mostly around the idea of 'actions' like play, stop, and so on.

With Flash Player 5, Macromedia introduced a new language for interacting with Flash, known as ActionScript (adobe.ly/kYVoPe). It was based on rudimentary actions of previous versions

and also borrowed greatly from JavaScript, such that it was regarded as a variant of ECMAScript. ActionScript 2.0 added features like a traditional OOP class model, a type system so you could constrain a variable to a certain type. A few years later, Macromedia introduced Flex, an SDK, IDE, and a set of integration libraries.

After the acquisition of Macromedia by Adobe in 2005, ActionScript 3.0 was released (adobe.ly/

[foa0BC](http://adobe.ly/foa0BC)). It remains the only complete implementation of ECMAScript version 4. It also adds support for packages and namespaces, and improves the performance of the class model to be more in line with prototypical inheritance. There are also several improvements that interface with Flash.

Although ActionScript was originally based on JavaScript, there are too many differences between the languages now to allow interoperability.

Instead it's the value that variables hold that holds the type. For example, I could define a variable `x` to have the value '0' (a number) and in the next statement set it to '0' (a string).

Dynamic typing leads to a great way to use objects: duck typing. This is exemplified by the statement: 'If it quacks like a duck, walks like a duck and swims like a duck, then it can be assumed to be a duck.' So if I present to you an object that has methods called 'quack', 'walk' and 'swim', and that's all you care about, then for all intents and purposes the object is a duck, even if it looks completely different if you consider additional attributes. An example of this with JavaScript involves arrays. Arrays have some standard methods like 'shift', 'slice', 'join' and so on, which also work very well with 'array-like' objects like the arguments object.

Duck typing is also an important part of using the DOM in JavaScript: if all you know about a DOM element is that it has `addEventListener` (and `removeEventListener`) then I can pass to you any object with those methods and get the observer pattern for free.

Objects are paramount in JavaScript. Apart from some primitive types like null, undefined, boolean, number and string, everything else is an object. An object in JavaScript is essentially a hash table or an associative array, that is, all properties and methods of the object are held as a table of key/value pairs. This is completely different from strongly typed languages where an object is cast from a class template and so all such objects are predefined and exactly the same. In JavaScript you can add new members to an object, modify them or even delete them.

Objects have a different inheritance model to the class model we're used to with strong OOP languages. JavaScript uses prototypical inheritance where the inherited behaviour comes from a prototype object. In essence,

you create an object with a desired behaviour (the prototype object) and associate it with a constructor function. You can then create new objects using the new keyword with the constructor, and they'll inherit the default behaviour of the prototype.

Figure 2 shows a schematic of prototypical inheritance between three objects. When you call the `'toString'` method of the top 'julian' object (`julian.toString()`), JavaScript will first look in the 'julian' object for the method. Since it's not there, it goes to the prototype object, which is a link to the 'person' object; 'toString' isn't there either, so JavaScript follows the next prototype link to the 'ancestor' object. There it finds 'toString' and can call it. Notice that overriding a method in this scenario is accomplished by merely adding the method at a higher level – the interpreter will halt following the prototype chain earlier on.

JAVASCRIPT FUNCTIONS

Then we come to functions in JavaScript, which are where much of the language's brilliance shines through. The first and most important feature of JavaScript functions is that they are first-class objects. You can assign them to variables. They can be passed as parameters to other functions (usually known as callbacks in this case). They can be returned from functions, so you can implement the functional programming construct known as currying. Functions that take or return other functions are known as higher-order functions.

CROSS-SIDE SCRIPTING

Cross-side scripting (XSS) is a type of security vulnerability usually exhibited by badly written web sites. In its most common form, a hacker will inject JavaScript code intermixed with HTML into HTML forms or HTTP requests on a page in the hope that the writer of the site didn't properly validate data from these inputs and that the site will use the input as it is, unsanitized.

Although it may seem that XSS would only affect the hacker, it's possible for someone to insert this XSS attack in completely unrelated sites using frames, or to use carefully formed links to the site being attacked. With these techniques, the attacker could gain the security privileges of the user – usually without the user even being aware that the attack is happening.

Functions are objects, so they support their own properties and methods, and members can be inherited through the prototypical chain. So, for example, all functions have a length property (the number of parameters expected by the function) and a call method that allows you to execute the function bound to any object you like. Although a function may be defined as a method on an object, you can execute it as if it were defined on some other object.

Functions can also be nested inside other functions. When you do this, scope resolution in JavaScript happens on a function level, not at the level of blocks (like every other C-style language). That means a nested function has full access to all the local variables defined at the outer function (and if that function is also nested, to the local variables defined in that outer function, and so on).

The next impressive thing is that the outer function can form a closure around its nested functions. In other words, a nested function can live on beyond the execution of its outer function and yet still have access to the outer function's local variables. Here's an example: imagine a function that returns another function. That returned function is a nested function. The outer function will terminate once it has returned its nested function, but its local variables live on as part of a closure so that the nested function can still refer to them when it is eventually executed.

JavaScript's ability to form closures gives it much of its power, but also causes some of the difficulties involved in working with it. This feature, together with the use of higher-order functions, enables JavaScript to become a functional programming language.

People use JavaScript every day when they surf the net. Google's auto-completion on its home page? JavaScript. Pages that reveal more information when you click an icon, like Facebook? JavaScript. Pages that refresh in real time, like Twitter? JavaScript. [\[1\]\[2\]](#)

COMPILING JAVASCRIPT

Software companies have recognised that one of the most significant barriers to a rich web experience is JavaScript code's inability to be parsed and executed quickly, without leaving the user waiting. This is especially true when loading a page: every script tag in the web page has to be parsed there, and the necessary code executed. The reason for this is that, in DHTML, you don't know what to display on the screen until the JavaScript code has been parsed and executed: it may be altering DOM elements, removing others, or even adding new elements.

To help with this, a great deal of work has been done over the past three to five years to improve the performance of JavaScript interpreters in the browser. The most impressive (in its day) example of this was Google Chrome's V8 engine: using standard benchmarks it blew away the competition. Today, all browsers have a highly optimised and tuned engine that pre-compiles JavaScript to machine code.



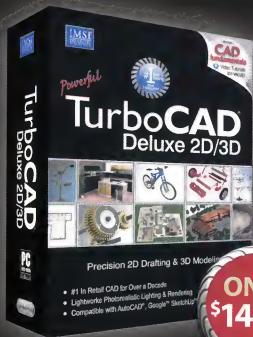
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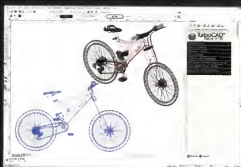
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WINDOWS

ACCESS RECENTLY OPENED ITEMS

Q I'm looking for a way to view recently opened documents in Windows 7 according to the date they were last opened. This option was available in XP. I didn't use Vista, so I don't know whether it was available then. The best I seem to be able to get in Windows 7 is a list of recent files without access times. Am I missing something?

Andrew Fortune

A The way Windows 7's 'Recent items' entry in the Start menu works is slightly different from previous versions of Windows. Anyone who doesn't have this feature enabled can activate it by right-clicking the 'Start' button and selecting 'Properties'. Next, move to the 'Start menu' tab and click the 'Customize' button. You can then tick the box labelled 'Recent items' before clicking 'OK', followed by 'OK' again. The Recent Items submenu isn't particularly

informative as standard and there's no indication of when an individual file was last accessed. The only extra detail that's readily available is the path of the file, which can be viewed by holding the cursor over a file name. However, you can access additional information by opening the folder containing the shortcuts to recently used files – right-click the 'Recent items' entry in the Start menu and select the 'Open' option. You can then use the Date Modified column to see which files have been accessed most recently, and use this to help track down files that were in use on a particular day. If you can't see the Date Modified column, you aren't working in Details mode. This can be activated by clicking the down arrow button in the toolbar (with the 'More options' tooltip) and then selecting 'Details', or you can press the [Alt] key followed by [V] to activate the View menu and then press [D] to select the 'Details' option. Don't forget that recently used files for individual applications can be accessed through jump menus by simply right-clicking a program's taskbar button.

HARDWARE

BOOST WINDOWS EXPERIENCE INDEX

Q I recently upgraded the hard drive in my Windows 7 desktop, hoping to not only increase storage space, but also improve performance. I have previously been using a 7,200rpm drive, while the new disk operates at a speed of 10,000rpm. When performing certain tasks, like copying files or editing videos, I have noticed a marked speed boost, but this doesn't seem to be reflected in the Windows Experience Index score. The new hard drive has a rating of 5.9, which is exactly the same as the older, slower drive. Can you suggest a reason for this?

James McDonald

A To calculate a computer's Windows Experience Index are unclear, as is the process behind the ratings assigned to individual hardware components. What we do know is that the scores for individual tests, as well as the overall rating, can range from 1.0 to 7.9. For hard drives, it seems traditional drives that rely on moving parts can never achieve a score that exceeds 5.9. This could be beaten by installing an SSD instead, but the important thing to remember is that the WEI ratings don't really matter. The figures are only used as a guideline to help users determine what software their computer is capable of running, and as long as you're happy with the performance with faster hardware, they shouldn't be of any concern.

DELETE UNWANTED PRINTER DETAILS

Q I have the 64-bit version of Windows 7, and this has caused problems tracking down drivers for my HP printer. There didn't seem to be a 64-bit driver for my printer,

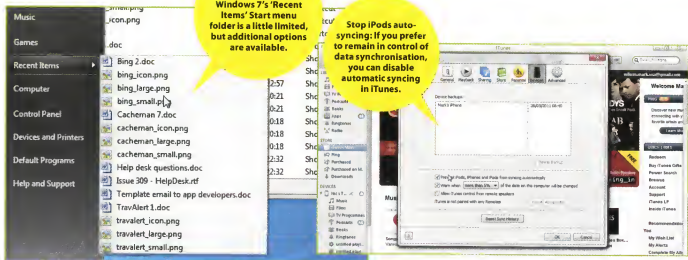
Rate and improve your computer's performance

The Windows Experience Index assesses key system components on a scale of 1.0 to 7.9.

Component	What is rated	Subscore	Base score
Processor	Calculations per second	2.2	
Memory (RAM)	Memory operations per second	4.5	
Graphics	Desktop performance for Windows Aero	2.0	
Gaming graphics	3D business and gaming graphics performance	3.0	Determined by lowest subscore
Primary hard disk	Disk data transfer rate	5.4	

View and print detailed performance and system information

Boost Windows Experience Index: WEI ratings provide guideline information only, and may not be affected by hardware upgrades.



but a search online revealed that many people had been successful using the driver for a different printer. I downloaded and installed the driver, but when I tried to print, I couldn't. Eventually, I gave up and purchased a different printer for which there were 64-bit drivers available. However, while the original HP Printer wasn't visible in the Devices and Printers Control Panel, when I select the 'Print' option from within an application, it appears several times in the list of available printers, along with an entry for my new printer. How do I get rid of the references to the printer that isn't connected to my computer?

Jonathan Parker

A Click 'Start', type cmd, right-click 'cmd.exe' and select the 'Run as administrator' option, before clicking 'Yes' in the User Account Control dialog. At the command prompt, type start shell:::{26EE0668-A00A-44D7-9371-BE064C98683} \0::({227A280-3AFA-1069A2DE-08002B30309D}) and press [Enter]. Right-click any of the printers and select 'Delete' from the context menu.

KEEP NOTEBOOK RUNNING

Q I have a Samsung QX410 notebook and I'd like to be able to close the lid and have it continue to run so I can keep downloading files without having the screen open. I know I should be able to set the computer to do nothing when the lid is closed, but the only option available to me is 'sleep'.

Nicholas White

A Since you own a Samsung notebook, it seems likely your problem is being caused by a startup program called Faststart. You should be able to run this from the Start menu and disable it. Having done so, restart Windows. You can then configure the lid-closing options. Open the 'Power options' Control Panel and click the link to the left, 'Choose what closing the lid does'. From the dropdown menu labelled 'When I close the lid', under the 'On battery' and 'Plugged in' headings, you should now be able to select 'Do nothing'. Click 'Save changes'.

SOFTWARE

STOP IPODS AUTO-SYNCING

Q I have a number of iOS devices, as well as several computers. To make it easier to keep all the apps and music libraries separate, I've opted to synchronise each device with a different machine – my iPhone syncs with my main PC, my iPod with my notebook, and my iPad with a MacBook Pro. This system works well for me, but when I'm using my desktop PC, I often want to plug in any of my three devices to charge them up. At the moment, iTunes automatically runs and tries to synchronise data – a process I have to stop manually every time. Can I prevent this auto-sync from taking place?

Harry Bantock

A You're in luck – there's a setting in iTunes that can be used to prevent automatic synchronisation, leaving

you to charge your devices whenever you want without the need to jump in and stop them syncing. Launch iTunes and click the 'Edit' menu, then select 'Preferences'. Click the 'Devices' icon at the top of the window, then tick 'Prevent iPods, iPhones and iPads from syncing automatically', and then click 'OK'. In future you will be able to synchronise by clicking the File menu and selecting the 'Sync [device name]' option.

DISABLE LIBRARIES IN WINDOWS 7

Q As much as I've tried to bring myself to like them, I find myself unable to work with libraries in Windows 7. Is there any way I can disable this feature and work with folders in the way I prefer?

Diana Oschen

A Windows 7's libraries are something people seem to either love or hate, and they can be a real time-saver once you get used to them. However, if you're sure you'd like to get rid of them, visit bit.ly/dUynsa, where you can download a REG file that will make the necessary changes to the registry – another REG file that reverses the process is also included in case you change your mind. Another option is to display your Personal folder as a menu in the Start menu. Right click the 'Start' button and select 'Properties' before moving to the Start menu tab and clicking 'Properties' again. Find the 'Personal folder' entry and select the 'Display as menu' option before clicking 'OK'. bit.ly/dUynsa

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MAYNAK
SHARMA

Maynak Sharma knows that secure passwords can often be tricky to remember, but he has all the tools to hand if he ever forgets one.

YOU'LL NEED THIS...

OPHCRACK LIVE CD

This free live CD boots into the password cracker tool and a selection of rainbow tables that do the hard work. Get it from ophcrack.sourceforge.net.

OFFLINE NT PASSWORD AND REGISTRY EDITOR

If Ophcrack can't find your password, extreme measures are the only way forward. This utility lets you delete your current password to gain access, but it's not without its risks.

Recover lost passwords

Thankfully, getting lost Windows passwords back can be just as easy as forgetting them.

Many of us have a love-hate relationship with passwords. They're great for dissuading youngsters from logging onto our machines and wreaking havoc with our files, but they're just as likely to turn around and bite us. Forget an obscure, intricately crafted password and you're in a world of pain. Windows lets you create password recovery disks (see 'Create a Windows password reset disk'), but what do you do if you're locked out without that disk? There are several tools that can help you recover the forgotten password, and the best of the lot is Ophcrack.

Its key utility reads the SAM (Security Accounts Manager) files in Windows – the files that keep user account passwords in LM (LAN Manager) or NTLM (NT LAN Manager) hash format. It uses pre-computed rainbow tables to recover the passwords. Security researcher Dr Philippe Oechslin developed them.

OPHCRACK

Ophcrack is licensed under the GPL, and is available as a free download for Windows and Linux from ophcrack.sourceforge.net. To retrieve your password, you'll need to boot into another OS installed on a separate disk or partition. We assume you know enough about your BIOS to change your PC's boot order.

The best way to use Ophcrack is via its live CD, which works if you don't have a dual-boot PC, or have forgotten the login password for all installations. The live CD is based on the minimalist SliTaz Linux distribution. You

can either burn the ISO to a CD, or use the YUMI Multiboot USB Creator (bit.ly/dZdzct) to copy the ISO to a USB drive. The live CD has two flavours: one helps you crack XP passwords, and the other targets Vista installations.

USING THE LIVE CD

When you boot from the live CD, you'll get a boot screen with several options. Usually, 'Ophcrack graphic mode – automatic' will work. Once the live CD boots you into the SliTaz graphical environment, it launches the graphical Ophcrack tool. It lists all the user accounts under the User column, and attempts to recover their passwords.

Unless your passwords are fairly complicated, have lots of characters or you're on a dated machine, the tool shouldn't take long to crack them. When it's done, they're listed in the NT Pwd column. If the field corresponding to your user is empty, there's no password for that user. Now all you have to do is note down the password for

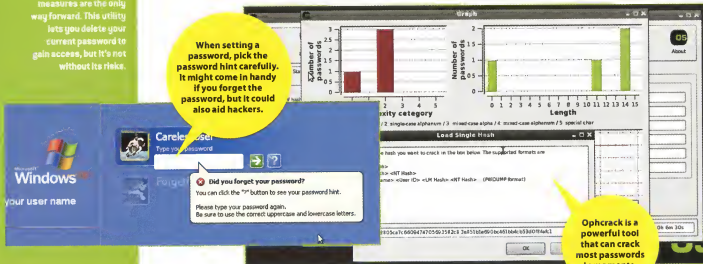
YUMI

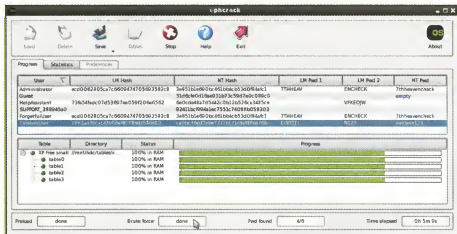
With YUMI Multiboot USB creator you can transfer multiple ISO images on to a bootable USB stick. The program has a graphical user interface, and is very easy to use. All you have to do is point it to your USB drive, select the distro from its list of supported distros (which includes Ophcrack), point to its ISO image and let it rip.

When setting a password, pick the password hint carefully. It might come in handy if you forget the password, but it could also aid hackers.

Did you forget your password?
You can click the "?" button to see your password hint.
Please type your password again.
Be sure to use the correct uppercase and lowercase letters.

Ophcrack is a powerful tool that can crack most passwords in minutes.





Ophcrack comes with an installer and can be used as a full Linux distro.

USE EXTRA TABLES

When using multiple tables, you can sort them with the up and down arrows. For best results on a Windows XP machine, you should use the XP free table first, then the Vista free tables, followed by any additional table that you may have bought. On a Vista box, you don't need the XP tables.

your users, reboot into Windows, and log in with your username and password.

The automated password recovery on the Ophcrack live CD should suffice for most situations, but if it doesn't, you can configure the program more comprehensively. Password cracking is a time-consuming task, but you can speed it up by asking Ophcrack to employ all the cores on your multi-core processor. Just switch to the Preferences tab in Ophcrack's interface and set the number of threads to a figure one greater than the number of cores. For example, on a quad-core machine, set the number to '5'. Make sure you restart Ophcrack after changing this setting.

Another way to speed things up, especially if your Windows installation has several users, is to delete any user accounts you don't need to recover the password for. Even if you're the only user, Windows will have a couple of extra user accounts like Guest and Administrator. Finally, you can increase your chances of cracking the passwords by installing additional

tables. Depending on which live CD you've downloaded, you'll either have the XP Free Small or the Vista Free table.

GET MORE TABLES

You can download additional tables from Ophcrack's web site. Besides the tables mentioned, only the 703MB XP Free Fast table is available for free. The others can be downloaded for a fee, and can be used to crack passwords that aren't based on dictionary words, include special characters, German characters or numbers, and are of various lengths. Once downloaded, simply copy the tables inside the 'Tables' directory in the root of your USB drive. Ophcrack will pick them up automatically on startup.

Although the Ophcrack live CD will automatically detect users on the system it's running on, it gives you the option to load the password hashes manually. This comes in handy when you're running it on a dual-boot machine or a remote machine.

The 'Load' hash button gives you several options to load the hash. The 'Single hash' option lets you specify the hash manually. With the 'PWDUMP file' option, you can import hashes created with a third-party tool like fgdump (www.foofus.net). You can also manually point Ophcrack to the SAM file you've grabbed from a remote machine. The SAM file is in the 'system32/config' directory.

Depending on how complex the password is, there's a remote possibility Ophcrack can't crack it. If you've been unable to discover your Windows password this way, you can always try resetting it with the Offline NT Password and Registry Editor (see below), but be aware of the implications before you start. If you asked Windows to lock your files with your password during installation, resetting it will give you access to the installation, but the locked files won't be recoverable.

Once you log back into Windows, change your password to something complex but that you're able to recall. [LIFE](#)

```
Press enter to boot, or give linux kernel boot options first if needed.
Some that I have to use once in a while:
boot nouse - to turn off USB if not used and it causes problems
boot irqpoll - if some drivers hang with irq problem messages
boot vga=ask - if you have problems with the videomode
boot nodrivers - skip automatic disk driver loading

boot:
```

If Ophcrack fails, call in the Offline NT Password and Registry Editor.

PASSWORD AND REGISTRY EDITOR

With the Offline NT Password and Registry editor, you can reset the password for any version of Windows. It's available as a 4MB live CD. When you boot from it, it will detect all the drives and partitions on those drives that have valid Windows installations.

The first step is to select the partition that houses the Windows installation whose

password you need to reset. Windows 7 creates a small, bootable partition as well as the regular Windows partition that contains the OS files, so make sure you point to the larger of the two.

Next, the tool asks you the location of the password registry. In most cases, the default path should work, unless you've tinkered

with its location — in which case you should have a fair idea where this needs to point.

After reading the password registry, the tool prints a list of users, and gives you the option to set a new password, wipe the password, enable/disable a user or escalate their privileges to those of an admin. Make sure you write the changes to the registry before exiting the tool.

PART 2

Tweaking Ubuntu Natty

Last month we covered the start of some essential tips for making the most of Natty Narwhal. This month we delve a little deeper with the overlay scrollbars, indicator applets and more.

APC
EXPERTASHTON
MILLS

Ashton Mills is the editor of CHOICE Computer and has been using Linux since Slackware came on floppies. Before this he was one of the three people in the world who used OS/2 (and loved it). Always ready to make the most of his PCs, he's constantly playing with Linux distributions and compiling the latest kernel. This is his idea of fun, and we happen to agree.

Love it or hate it, the Mac OS inspired global menu is here to stay. But if you hate it, you can disable it. There are a number of solutions circulating the web, usually involving forcibly removing packages or moving libraries, but this isn't a good idea – especially when it's time to install updates via the Update Manager. Instead, open a terminal (Ctrl > Alt > T) and create a new file that clears the global menu environment variable and load it after the global menu script for the X session:

```
sudo -s
echo "export UBUNTU_MENUUPROXY=" > /etc/X11/
Xsession.d/81disableglobalmenus
```

You can call the file anything you want, as long as it starts with a number higher than 80 (the file '80appmenu' enables global menus. You can edit this file, but again it may be restored by updates). Log out and log in again to trigger the change.

OVERLAYS

You may also have noticed the new overlay scrollbars – these appear on the edge of a window to scroll only when your mouse is close, and attach to the edge of the window itself. These are another space-saving feature that work reasonably well for small screens but can be hard to grab on some dialogs. Again you can remove the packages that provide this functionality, but this is a bad idea. Instead, let's add another entry to be loaded for the X session:

```
sudo -s
echo "export LIBOVERLAY_SCROLLBAR=0" > /etc/X11/
Xsession.d/82disablesrollbars
```

PANEL APPLETS

The new Unity desktop has an unfortunate side-effect – all your beloved panel applets will no longer work. All is not lost, however, as they can still run in the indicator dock, as long as they've been ported to run there.

At the time of writing, this doesn't include a huge range of applets, but some favourites have already made the transition. To install the weather applet, a sysmonitor and the Ubuntu One indicator run:

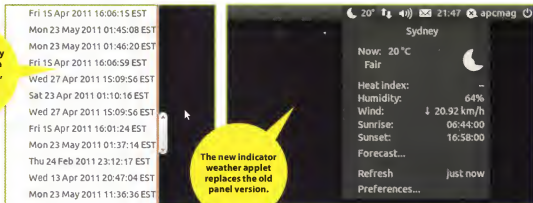
```
sudo apt-add-repository ppa:roignac/weather-
indicator
sudo apt-add-repository ppa:alexfetmie/ppa
sudo add-apt-repository ppa:rye/ubuntuone-extras
sudo apt-get update
sudo apt-get install indicator-weather indicator-
sysmonitor ubuntuone-indicator
```

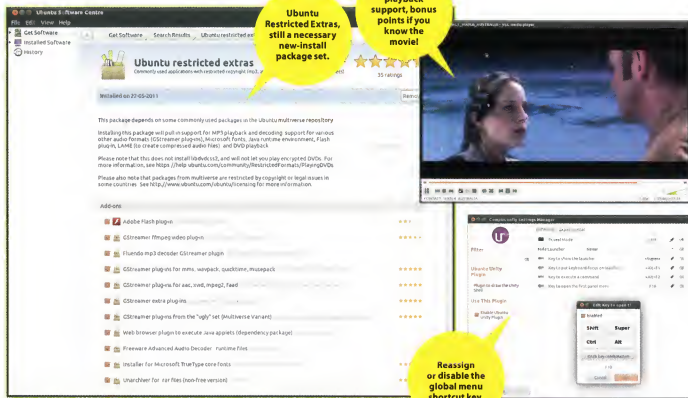
The weather indicator will automatically be added to your indicator dock. For the rest simply enter 'indicator' into the Unity search bar (click top-left Ubuntu logo) and run them. When you next reboot, they'll load.

Some other handy indicators include CPU frequency

The new overlay scrollbars are a matter of taste, and can be disabled.

The new indicator weather applet replaces the old panel version.





(ppa:anton-sudak/indicators, install indicator-cupfreq) and the VirtualBox virtual machine switcher (ppa:artfwo/ppa, install indicator-virtualbox). There are other PPAs for indicator applets, search for 'indicator' on launchpad.net.

DVD PLAYBACK

After all this time you still can't play DVDs out of the box due to export restrictions. Enabling is easy enough though – launch the Software Center and search for 'restricted', then click and install Ubuntu Restricted Extras. By default this will also install Flash for you, which is nice.

Note that, as before, once the packages are installed there's one more step you need to take to enable playback of copy-protected DVDs:

```
cd /usr/share/doc/libdvbstream4
sudo ./install-css.sh
```

You only need to do this once.

What about Blu-ray playback? As the newer format that's a little bit fiddly at the moment, but see next month's Open Source Challenge for how to do this.

UNITY 2D

By default, Unity relies on accelerated 3D support for some of its special effects, but

not all modern machines – especially notebooks – are powerful enough under the hood. Canonical kept this in mind while developing Unity and provided a version that runs without accelerated effects: Unity 2D. It looks exactly the same and operates only slightly differently where 3D effects like shadows and animations would be applied. If Unity runs a little slow on your system, give Unity 2D a try – you can install both side by side.

To install it, simply launch the Software Center and search for 'Unity', then install the Unity 2D package set. After installation, log out and, after typing your user name to log in again, click Session at the bottom of the screen and select Unity 2D as your desktop. You can switch back at any time by logging out and selecting Ubuntu for the Session.

TERMINAL TIPS

If you use the terminal frequently, there are some tips that still apply to Natty and, unfortunately, some extra tweaks you need to make if you're a fan of the powerful Midnight Commander file manager (and if you're a command-line commando, you likely will be).

First, install the Terminus font, which is a little easier on the eyes for long terminal sessions: open a terminal and run `sudo apt-get install xfonts-terminus`, then log out. After logging in, launch a terminal and in the

global menu bar (or on GNOME Terminal if you've disabled 'Global menus') click 'Edit > Profiles > Edit', deselect 'Use the system fixed width font', then click the 'Font' dropdown box to find 'Terminus'. Set the point size to taste.

You may note after installing Midnight Commander (`apt-get install mc`) while using global menus that your beloved [F10] key to exit MC acts as a shortcut key for the global menus instead. Unless you really want to keep this, you'll need to clear the [F10] association for both Unity's global menus and GNOME Terminal's menus.

To do this, first make sure you've installed the CompizConfig Settings Manager (see last month's Open Source Challenge) and then load up the Unity plug-in ('Power Button > System Settings > CompizConfig Settings Manager > Ubuntu Unity Plugin'). Under the 'Behaviour' tab you'll see common shortcuts defined. Click [F10] that's next to 'Key to open the first panel menu' and deselect 'Enabled', then close.

Next, in a terminal, click 'Edit > Keyboard Shortcuts'. Deselect 'Enable the menu shortcut key (F10 by default)'. Now [F10] will be properly passed to MC running in a terminal (F10 is a popular key!).

Next month we'll continue this series with a third installment of making the most of a new Natty Narwhal install. [\[E\]](#)

APC
EXPERT



JENNETH
ORANTIA

An expert on all things mobile, Jenneth Orantia has been writing reviews and tutorials on smartphones for the last seven years. Her current phone of choice is the iPhone, but she's also well-versed in Windows Mobile, Symbian, Palm and BlackBerry.

Stream content from your i-device to a compatible player with AirPlay



Hack AirPlay and Air Video for Android

Apple is slowly losing its advantage.

Android may be superior to iOS when it comes to power user features, but as far as streaming media goes, iPhones and iPads are still king. This is thanks to two functions in particular: AirPlay, which is an Apple technology that lets users stream content on their i-devices to a compatible player (such as Apple TV or an AirPlay-compatible speaker dock); and Air Video, which is a third party program that enables you to stream and convert videos stored on your desktop computer to an iPhone or iPad.

Of course, this advantage was only good until someone figured out how to port it to other smartphone platforms. Android users can now take advantage of these technologies with the third party apps doubleTwist AirSync and Mirage. doubleTwist AirSync is the paid version of the popular doubleTwist media player, and allows you to stream photos, music and videos stored on your Android smartphone over a wireless network to AirPlay-enabled devices, as well as to an Xbox 360 or PlayStation 3 (and it also enables wireless media syncing with iTunes and the desktop version of doubleTwist – but that's fodder for another how-to). Mirage, on the other hand, works in the opposite direction, and interacts with the free Air Video server app (compatible with PC and Mac) for streaming movies to compatible Android smartphones over Wi-Fi from your home computer.

We'll start with getting doubleTwist AirSync and an AirPlay-enabled device (in this case, Apple TV) talking. Install both doubleTwist and doubleTwist AirSync on your Android smartphone and connect it to your home wireless network (your smartphone and Apple TV will need to be on the same wireless network for this to work). Next, open doubleTwist, press 'Menu' and tap on 'Settings', then 'AirTwist & AirPlay' to configure the connection. Tick the 'AirTwist & AirPlay' checkbox, and

you should see the name of your wireless network under the 'AirTwist is enabled for these Wi-Fi networks' setting. If not, tap the 'Allow Wi-Fi network' setting to activate the wireless network your smartphone is currently connected to for AirTwist.

To start playing media on your smartphone through the AppleTV, open it first in doubleTwist, tap on the screen to bring up the playback controls, then tap on the AirTwist icon in the bottom right-hand corner. An option will appear to connect to AppleTV (or whichever AirPlay-enabled device you've set up), and once this is selected, the currently playing media will output to your TV.

Unfortunately, Mirage, the third party app that works with Air Video, doesn't yet support streaming video over 3G (a feature that's available in the iOS Air Video client app), so Android users are currently limited to streaming video from a home computer that's connected to the same wireless network as the Android smartphone or tablet. Another, more serious limitation is that it's only compatible with Android devices that use Neon- or Tegra-based processors, which essentially rules out all but the very latest smartphones and tablets.

Provided your Android device is supported, setting up the live video streaming is relatively easy. Download the free Air Video server software from the developer web site (bit.ly/lwWFvV), then download the Mirage client software from Android market. In the Air Video server software, you can configure the folders that the app looks in for videos to stream, and this can include external hard drives. Once that's done, open Mirage, click the 'Menu' button, tap 'Servers', and it should auto-detect your computer that's running the Air Video server software. From there, it's a simple case of navigating to the video you want to stream to your device. [MORE](#)



Your Nook can be so much more than just an ereader. All you need to do is root it.

Turn your Nook into a tablet

The Nook is Barnes & Noble's version of the Kindle but it can also be easily converted into an Android tablet.

APC
EXPERT



ROBERTO
ROMANO

Roberto Romano has a wide background in the software development lifecycle and is currently a testing specialist. He also likes to make hardware submit to his demands

Unlike the well-known monochrome ereaders such as the Amazon Kindle and the Sony Reader, the Barnes & Noble Nook Color is a 7in ebook reader that supports 16 million colours on a very bright touchscreen at a resolution of 1,024 x 600. This is way better than the meagre 800 x 480 offered by most 7in 'budget' tablets, such as the Telstra T-Touch or Optus My Tab. This high resolution allows for crisp viewing of magazines, picture books, photos and videos.

The Nook is nice hardware. It's been carefully designed, starting with the compact and stylish packing box with an intriguing magnetic lid. The body has a silky finish and smooth rounded edges and corners, with a soft, non-slippery back and conveniently placed on/off and volume buttons. The microSD expansion slot is well tucked under the bottom right corner, covered by a magnetic lid.

Overall, it's a device that rivals the iPad in the style department, although there's no point comparing the Nook to the iPad, since they're very different. The iPad is a much larger tablet and costs more than twice as much, but the Nook is attractively priced and far more portable. Interestingly, the Nook app is now available on the iPad and allows books to be shared between the devices.

The Nook ships with Android 2.1 running on an 800MHz processor. Wi-Fi is included (802.11n), but not 3G. There's a built-in mono speaker and a mini headphone jack, handy for picture audio books,

and one USB port. It has 8GB of internal flash memory but only 5GB is available. It supports up to 32GB of external storage through its microSD slot. Battery life is around 8 hours.

The pre-loaded apps include an email client, a mobile Office suite capable of reading Word, Excel, PowerPoint and PDF files, Pandora internet radio, a media gallery and games like Chess and Crossword. But you can do a lot more with the Nook than is provided out of the box. You can turn it into a more versatile Android tablet. The device runs Android 2.1 but can be coerced into running 2.2 by a procedure called 'rooting'.

In short, this means getting administrator access to do things a normal user can't do. At the time of writing, there's also a new version of Android designed specifically for tablets, called Android 3.0 'Honeycomb', which can easily be installed and run directly from the microSD card.

Rooting will allow you to install market and non-market Android apps. These include apps from other ereaders, like the Amazon Kindle, to allow other ebook formats to be read on the Nook. Google Earth, Maps and Sky Map can also be installed. Take a look at www.androidmarket.com for an idea of what's available. For more info on how to root the device and extend its capabilities, visit nookdevs.com/nookcolor_rooting.

If you're after a top quality, affordable 7in tablet, the Nook Color won't disappoint. You can get one on eBay for less than \$300. [EUS](#)

APC
EXPERTKARL
HODGE

Karl Hodge is a journalist who's been using, building and writing for the web since 1992.

YOU'LL
NEED THIS

NIVO SLIDER

This free jQuery-powered library features 16 transition effects, supports HTML captions and works across all the main browsers. Get it from nivo.dev7studios.com.

Make animated web shows

Create clean, lean slideshows and style them with CSS to fit in with your site.

Nivo Slider is a jQuery-powered library which is an alternative to the widely used Lightbox. It lets you embed a set of images into any web page, playing them back automatically while applying a chosen transition between frames.

INSTALLING THE SCRIPT

Installing Nivo Slider is a fairly involved process, but once it's in place, there's relatively little work needed to build slideshows. The first step is to download the required JavaScript and CSS files in ZIP format.

Extract the archive and upload the resulting folder, 'nivo-slider', to the root or web documents folder of your site. There's a dummy page you can try out straight away to ensure the code is working in the 'demo' folder. Because Nivo Slider uses jQuery, which is hosted on Google code rather than on your server, it will work fine from your desktop without the need for a staging server.

To get things moving, we need to embed the script we've uploaded into a page. As with Lightbox, we need links to a framework (in this case, jQuery), a link to the script library (Nivo Slider) and a link to the CSS file that lays out and styles the slideshow viewport:

```
<link rel="stylesheet" href="nivoslider/nivo-slider.css" type="text/css" media="screen"/>
<script src="http://ajax.googleapis.com/ajax/libs/jquery/1.4.2/jquery.min.js" type="text/javascript"></script>
<script src="nivo-slider/jquery.nivo.slider.pack.js" type="text/javascript"></script>
```

INVOKING NIVO SLIDER

Linking to the code is only part of the battle. To get Nivo Slider to work, it must be loaded when your page loads. To do that, use the JavaScript 'load' function:

```
<script type="text/javascript">
$(window).load(function() {
$('#slider').nivoSlider();
});
</script>
```

With the library code embedded you can create simple slideshows. All you need to do now is create a <div> and assign it the ID 'slider'. Next, add images between the <div> tags using standard HTML syntax. There's no need to add specific attributes or special

code to tell Nivo Slider to do its job – setting the <div> ID to 'slider' does all that for you. This code creates a simple slideshow with three images, for example:

```
<div id="slider">



</div>
```

To add captions, you can use the standard HTML 'title' attribute. Something like this will do the trick:

```

```

Nivo Slider also lets you add HTML to captions. It's a little more involved, though. Instead of typing a text string, you add a CSS ID to the title attribute, as follows:

```

With this ID defined, we now create the HTML-formatted caption within a <div> tag:
<div id="caption" class="nivo-htmlcaption"> <div>Big tough toys for big tough boys</div>
<a href="http://www.hasbro.com/tonka">Tonka</a> trucks were a 70s icon.
</div>
```

EDITING TRANSITIONS

Nivo Slider has a list of transitions that can be applied to images as they transform. You can set the transition to one specific type, define a set or create randoms. The code goes in the load script that initialises Nivo at launch, as a parameter of the function Nivo Slider:

```
<script type="text/javascript">
$(window).load(function() {
$('#slider').nivoSlider({_e_ect:'fade',
animSpeed:500,
});
});
</script>
```

We've only scraped the surface of what's possible. With over two dozen transition parameters and CSS styling, you can customise the player a lot more. [\[TUTORIAL\]](#)

Don't fry your driver

You should never plug power adapters in willy-nilly – first check polarity, voltage and current.

APC
EXPERT



ROBERT
GAREB

Although now in IT, Robert Gareb has been an electronics enthusiast since before his teenage years – in the days when you used a soldering iron to build a computer.

A recent contributor to APC wrote that he had a failed hard drive and tried different power packs (AC adapters). He even said, "One power pack I tried did result in the power light flashing on for the briefest of moments."

Whoa. This can fry your equipment. Many people think that if the plug fits then it should work.

With adapters, there are a number of considerations to check before plugging in – otherwise the "briefest of moments" will cause the destruction of the device or appliance. Today, most devices use DC, i.e., a fixed voltage where one pin is positive and the other negative. Firstly, you need to take polarity – positive and negative – into consideration. The centre pin can be positive or negative. Normally there's a symbol that looks like a letter C with a line in the middle leading to a plus symbol – this means the centre pin is positive. If it's a minus symbol, it means the centre pin is negative.

If it's the wrong polarity, then it's the wrong adapter

and it mustn't be used. Get the original adapter or a suitable one. If unsure, it is safer to ask a qualified person than take a chance, as once the wrong one is plugged in and there's a puff of smoke from the device or adapter, it's too late!

Next, you have to check the voltage – if the adapter you plug in has a higher voltage, it can also destroy the device. The voltage is different on different devices – some are 5V, many are 12V, some are higher (for example, most Toshiba notebooks use 19V).

Finally, there's the current capability of the adapter. If the adapter can provide more than the device uses, that's not an issue, but if it's less, the device will not have enough power to drive it. AC adapters usually have a rating in amps, e.g., 4A or 5A.

So if you're not sure, please check polarity, voltage and current before plugging in – or ask a person with technical knowledge to assist you. bit.ly

GET A NEW KIND OF APC

EVERYTHING IN THE PRINT
EDITION – NOW ON THE iPad!

STEP
01

First, get yourself an iPad. Second, fire up iTunes on your PC, go to the Apple App Store and download the Magshop app. You can search for it by typing "Magshop" in the search field. Please note, the free app is NOT the magazine. It's just the viewer that will display the magazines you buy.

STEP
02

When you have downloaded the app, run it on the iPad and select the browse symbol along the bottom of the screen. You will see the latest APC issue for sale among the rest of Magshop's catalogue. Tap the APC cover and you will be given the option to buy the latest issue.



FOR MORE DETAILS ON OUR iPad ISSUE, GO TO APCMAG.COM/iPAD

Get more from Twitter

Push the quick-fire social network further than you thought possible with these hints and tools.

APC
EXPERT



JOE
CASSELLS

Joe often has to reformat his PC because of his predilection for tinkering with Windows.

1 RUN A TWITTER SEARCH

There's a reason Google includes Twitter results in its searches. Twitter can provide you with the most up-to-date results for searches, many of which have been recommended by its users. Browse to **search.twitter.com** and enter your keywords in the search bar. You can include Twitter usernames beginning with '@' or hashtags. Click 'Search'. The results are sorted by time of posting, with the most recent first. You can filter by language and translate tweets into English.

2 ADVANCED SEARCH

A simple search may be enough for most occasions, but sometimes you need to dig a bit deeper to get high-quality results that are relevant to you. Follow the link marked 'Advanced search' and you can specify the location of the tweets returned and a date range. You can also set the attitude of the tweets you're looking for (whether they seem generally positive or negative), and specify the author by Twitter username and any recipient.

3 BACK UP TWEETS

If you've been using Twitter for some time, you may be surprised by the number of tweets you've accumulated. You may well find you've posted enough messages to fill a novel or two. Backing up your tweets is a sensible precaution to take so you have a local copy in case anything goes wrong. Twitter Backup (available from bit.ly/gm1GXP) is a Java program that downloads

all your existing tweets to an XML file. Just enter your username and password, then provide a filename for the results. You'll need to log in to Twitter in your browser and authorise the application, which includes obtaining an authorisation code to paste into Twitter Backup. The backup is stored on your PC.

4 ONLINE BACKUP

If you'd rather entrust your tweets to a cloud-based service, try Tweet Backup (tweetbackup.com). It's an online service you can use to back up your tweets on a daily basis. You need to register using your Twitter credentials via OAuth. You also need to supply an email address for contact purposes. Once logged in, go to the 'View posts' tab to see your 50 most recent tweets. Choose 'Export' and select a file format to download your most recent backup file. You can download your tweets in plain text, HTML or RSS format.

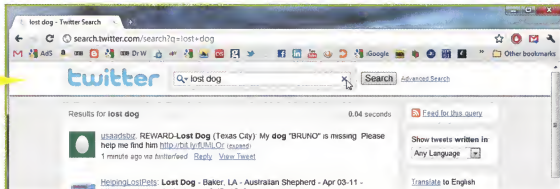
5 SEND A GIFT

Do you have an online friend you'd like to send a gift to? Perhaps you have a demo or portfolio you'd like a potential client to see. It's quite common to need to send or receive items at a time when either party might be a little concerned about revealing their full contact details. Send Social (sendsocial.com) acts as a trusted go-between, arranging to courier your items without sharing addresses. You can request a shipment despite only knowing your contact's email address or Twitter handle. Send Social contacts them and arranges delivery via its courier partner.

6 SHARE FROM CHROME

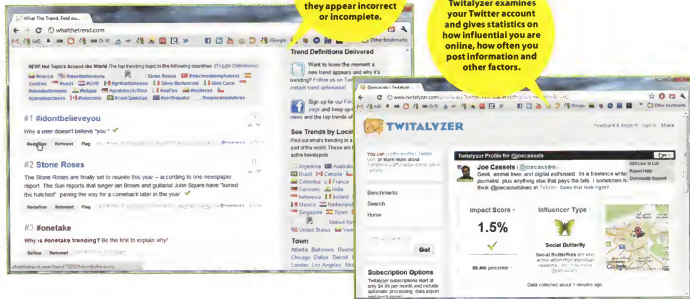
Twitter is great for sharing things you've found online, but copying a URL, shortening and pasting it into

A simple Twitter search can provide useful results that haven't yet reached the main search engines. It's a great resource for breaking news.



Use What the Trend to find out more information about a current hashtag. You can edit entries if they appear incorrect or incomplete.

Twitalyzer examines your Twitter account and gives statistics on how influential you are online, how often you post information and other factors.



a tweet can be a clumsy affair. Even if you have a URL shortener built into your Twitter client, you still have to copy and paste the full URL of anything you want to share. TweetRight, available from bit.ly/hA1bt6, is a Chrome extension that makes it easy to send links to Twitter. Right-click the item, choose 'TweetRight' and then click 'Post link to Twitter'.

7 TRY ECHOFON FOR FIREFOX

Echophon (bit.ly/fwD9qf) is a Twitter client that works directly inside Firefox. Once you've installed it, you'll see an Echophon icon in the status bar of Firefox. Double-click it to open your Twitter program. It will appear on top of the web page you're viewing. As tweets appear, you'll be updated with a pop-up message showing their number and a brief preview. Echophon is also available as an iPhone client, and standalone client for OS X.

8 EXAMINE HASHTAGS

Find out the meaning of popular hashtags by visiting www.whatthetrend.com. You can choose trending topics, or search for a term. To learn more about a tag, try The Archivist (archivist.visitm1x.com). Enter your search term and click 'Start analysis' to see key statistics on the tag's use, including popularity over time and top users tweeting the term. You can check recent tweets too. Summarizer (bit.ly/jypPQN) searches the Eduserv archive to provide statistics on a tag or user. You can see top conversations including it and the term's geographical distribution.

9 SIMPLIFY THE INTERFACE

Dabr (bit.ly/iZq6Vr) is an alternative

web frontend to Twitter that's been optimised for mobile use. It's not as pretty as the main Twitter site, but it's quick and efficient. It offers many of the functions some third-party clients provide, and many users on notebooks and desktop PCs opt to use Dabr because of its speed and ease of use. Browse to the site and log in with your Twitter credentials. Icons next to each tweet enable you to quickly reply, retweet, mark as a favourite or direct-message the user. TwitPics appear as thumbnails in the timeline.

10 PREDICT FOLLOWERS

Want to find out how many followers you're likely to pick up by next month? Twitter Counter (www.twittercounter.com) analyses your account and provides the number of followers over time plotted on a graph. It uses this information to extrapolate your likely follower growth in the future. You can also find statistics like your current ranking on Twitter according to follower numbers, and compare this to the most popular users on the service. You can then enter a friend's username and compare your progress, checking follower numbers and number of updates.

11 TWEET YOUR BLOG POSTS

If you have a blog, it's a good idea to let people on Twitter know you've posted an update. You can tweet a simple link, but doing so manually can be a hassle. Twitter Feed (www.twitterfeed.com) lets you automate the process by linking your blog's RSS feed to your Twitter account. You can sign in using OpenID and link Twitter to your blog. You can check for updates at hourly or daily intervals, and include your blog post title in the tweet.

12 FIND MORE STATS

Continuing the theme of Twitter analysis, Twitalyzer (www.twitalyzer.com) provides a different set of statistics to those offered by Twitter Counter. Browse to the site and enter a username to analyse it. This can take a few minutes. Results are presented in five areas: Influence, Signal, Generosity, Velocity and Clout. Signal is the proportion of tweets that contain information, Generosity is how willing the user is to retweet, Velocity is how regularly tweets are made, and Clout is how often the user is referenced by others. Influence is a combination of these scores.

13 FIND OUT WHO'S UNFOLLOWED YOU

Who followed you initially and sneaked off when you followed back? Friend or Follow (www.friendorfollow.com) helps you find the answer. Go to the site and enter your username. Friend or Follow analyses your account and presents three lists: people you're following but who aren't following you back; people who follow you who you aren't following back and people you're following who are following you.

14 SCHEDULE TWEETS

It can be handy to set up tweets in advance. The easiest service to use for this is SocialOomph (www.socialoomph.com), because you don't need to leave your PC running for the scheduled updates to show. Sign up for an account and then enter your Twitter account details, authorising via OAuth. You can now select the account you want to use and set up a message. bit.ly/iZq6Vr



workshops

HANDS-ON WITH HARDWARE & SOFTWARE

Calibrate your monitor

Mike Bedford discovers how to adjust your screen so that dodgy colours are a thing of the past.

YOU'LL NEED THIS...

GREYSCALE TEST CHART

This helps you adjust your brightness and contrast settings. They're plentiful online.

GAMMA TEST CHART

For adjusting the gamma, you'll need a gamma test chart. Again, there are plenty online, but we prefer the one at bit.ly/4267Lj.

Most monitors aren't correctly adjusted. It's a fact. The result is you don't see all the detail in onscreen images, and the colours aren't accurate. At one time this might only have been an issue for professional photographers, but today, even just about everyone stores, edits and views their photographs digitally, we all need a properly adjusted monitor. It's not just onscreen viewing – see 'Photographic prints' on page 98 to see why a poorly adjusted monitor can result in disappointing hard copies.

Having a correctly adjusted monitor is important in areas other than digital photography too. Even if you're just browsing the web or playing games, unless your monitor setup is correct, you could be missing out by not seeing images in the best possible light.

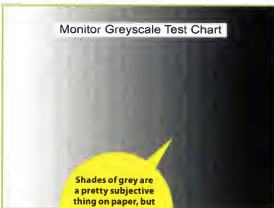
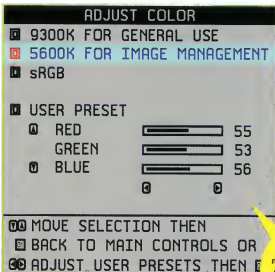
Monitor adjustment can be a complicated and costly process if you use specialised hardware, but it doesn't have to be that way. Here we'll look at some of the simple, free ways of setting up your monitor. A professional level photographer or a very serious amateur might need more advanced tools, but even the simple methods we look at here are capable of making a vast difference.

Before proceeding, make sure your monitor has been turned on for at least 30 minutes so it's had time to warm up, and restore its default settings using your graphic card's control program. This will probably force at least 24-bit colour, and in the case of an LCD monitor, will return the panel to its native resolution. If not, make sure to select these settings before continuing.

COLOUR TEMPERATURE

The easiest and perhaps most fundamental thing to adjust is colour temperature. Using the official jargon, the colour temperature of light is the temperature of what's known as an 'ideal black body radiator', at which the colour of the light and the black body are identical. Although an ideal black body radiator is a theoretical concept that doesn't exist in reality, it isn't too far removed from everyday experience. We're familiar, for example, with the fact that an object commonly glows red when it's heated to a sufficiently high temperature, and that if it's heated further it glows orange, then yellow and then white.

What might be less familiar is that at even higher

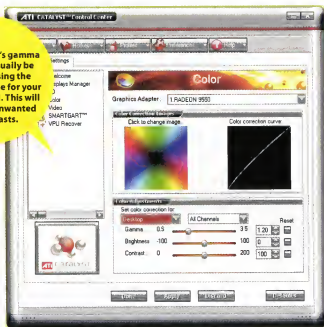
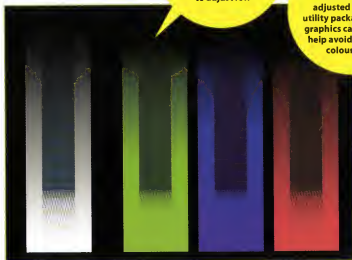


Shades of grey are a pretty subjective thing on paper, but not on screen – a test chart will help you find the perfect level.

Change your monitor's default of 9,300K colour temperature to 5,600K.

Using a three-colour variant of the gamma test chart, it's possible to make corrections for colour casts. Blue is the most difficult colour to adjust for.

Your monitor's gamma value can usually be adjusted using the utility package for your graphics card. This will help avoid unwanted colour casts.



temperatures, objects start to take on a bluish hue. If we keep to the middle of this range, shades of white, the lower temperatures represent warm whites and the higher ones (paradoxically) correspond to cooler-looking whites. For example, the colour temperature of a tungsten filament light bulb is about 2,500-2,900K (K stands for Kelvin, a unit of temperature that's the same as degrees Celsius, but offset such that 0 is equal to -273°C), while a halogen bulb is higher and an average sunlit scene is around 6,500K.

As shipped from the manufacturer, most monitors are set up for a colour temperature of 9,300K. This is the colour that pure white will appear, and while it might be a perfectly suitable setting for applications like word processing or engineering drawing, it's far too blue for photography, games or web browsing. You need something closer to the colour of a daylight scene – around 6,500K.

This is easily achieved using your monitor's setup menus (normally buttons on the front of the monitor). Select the menu entry for colour

temperature and select 6,500K (sometimes shown as D65) instead of 9,300K (or D93). If you're used to using monitors set to 9,300K, this new setting will look decidedly dull, but persevere and your eyes will soon get used to the new and more accurate colours.

BRIGHTNESS/CONTRAST

Just as most monitors are set to the wrong colour temperature for a large number of applications, brightness and contrast often aren't correctly adjusted either. If the monitor is too dark, all shades of grey darker than a certain threshold will appear black, and if it's too bright then all shades of grey brighter than a certain threshold will appear white. The former means you won't be able to see detail in dark areas of photographs, while the latter means detail in bright areas will be lost.

Display a greyscale test chart on screen. You can make your own using a graphics package, or choose one of the many charts available online. If you're making your own, you need to make sure it has around 21 levels

of grey from pure black to pure white, in steps of 5% in brightness. Ensure you're working in a room with subdued lighting, but not totally dark. The aim is to adjust the brightness and contrast so all the shades can be distinguished from each other, using the lowest brightness setting to achieve that. This is very much a matter of trial and error, but as a starting point, try setting the contrast to 100% for a CRT monitor or 40% for an LCD monitor, and adjusting the brightness as necessary. How easy this is will depend on the quality of your monitor. It may not be achievable – in which case you'll have to accept a compromise.

GAMMA ADJUSTMENT

If the brightness and contrast have been set up correctly, a colour defined by the software as (0, 0, 0) will appear as pure black, while (255, 255, 255) will appear as pure white. These examples assume 24-bit colour. In each, the first figure in brackets represents the amount of red in the range 0 to 255, the second figure is the amount of green, and

HARDWARE COLOUR CALIBRATION

In the main part of this workshop, we present some quick and free ways of adjusting your monitor for accurate colour reproduction.

As always though, the quick and free methods aren't always the best, and if you're serious about your photography you should consider a hardware calibration device like the Pantone Huey or the ColourVision Spyder 3 Express.

These devices attach to the front of the screen, and measure the intensity and colour

of the light emitted by the monitor. They work with special software, supplied with the device, that displays known colours onscreen.

For each colour that's displayed, the device measures the colour displayed and is able to create a monitor profile that compares theoretical colours with those actually displayed. The profile is used to make the necessary corrections so the colours appear as they should, helping you edit photos with confidence.



The ColourVision Spyder 3 Express eliminates the human factor from monitor calibration.

PHOTOGRAPHIC PRINTS

Paradoxically, a poorly set up monitor won't only affect how your photographs appear on screen — it will also influence the way they appear on paper. Whether you print them yourself on an inkjet device or have them done professionally on proper glossy photographic paper, a badly adjusted monitor can have a negative effect on your print. Or at least, it will if you take the trouble to edit your photos before printing them.

Imagine you go out and take a photograph of a country scene in the evening as the sun is going down, giving the shot a warm glow. When you come to look at it onscreen, you find that it

isn't quite as warm as you remembered. Of course, this isn't a problem to the experienced digital photographer and a few minutes later, courtesy of a photo editing package, that photo once again appears as the scene did in reality. In fact, you like your creation so much that you order a large-format glossy print from your favourite online store. But what arrives in the post a couple of days later is a parody of the real scene, almost reminiscent of a bread advertisement in its unnatural warmth. So what went wrong?

The problem was that the monitor was set to a colour temperature of 9,300K — as indeed

most are — which is cold and therefore had the effect of partially cancelling out the inherent warmth of the scene. Had it been printed out before editing, it would have looked fine, but the false impression on the monitor resulted in the colour balance being adjusted during photo editing. This made the shot far too warm, though it looked right on screen.

Had the monitor been set to the recommended colour temperature of 6,500K, this wouldn't have happened. The same applies to other aspects of the monitor setup, brightness being an equally important and fundamental setting.

the third blue. You might assume, therefore, that a value of (127, 127, 127), for example, would appear as 50 per cent grey, but this isn't necessarily the case. This would only be true if the gamma value was equal to 1, which means the relationship between the input bits and brightness is linear. In reality, because the human eye doesn't have a linear response to light, this setting wouldn't result in the most accurate rendering of photographs. If the gamma setting is too low, mid-level tones will appear too light; if the gamma setting is too high, they will appear too dark.

The recommended value for gamma is 2.2, so for optimum results adjust your graphics card settings until an image appears as expected at this value. Test charts feature two squares, one solid grey, and the other alternating black and white bands so it appears the same shade of grey as the solid square at the correct gamma setting.

To adjust the gamma value, display a test chart on screen. Some are created specifically for a given gamma setting, in which case you should choose one for a value of 2.2, whereas others display a sliding scale. Examples can be found at bit.ly/1ZG7Lf and bit.ly/1hblLR.

PRINTER PROBLEMS

If your inkjet prints don't match your onscreen photographs, don't be too keen to blame your monitor. Prints will rarely appear identical to images on screen, although prints on proper photographic quality glossy paper will come closest to a perfect match.

Look at the chart either from a distance or while squinting so the black and white lines merge and you just see each square's average brightness. Now adjust the graphics card's gamma setting until the grey and the black and white squares appear the same intensity for a gamma value of 2.2.


Confusingly, some graphics cards indicate that their default gamma setting is 1. In such cases this is a correction factor — the real default setting will probably be 2.2.

COLOUR ADJUSTMENT

While the settings we've seen so far are the most important when it comes to ensuring

colours look accurate on screen, your monitor may also exhibit a colour cast, even after the colour temperature is set to 6,500K. To fully address this, you'll need a specialised hardware calibration device — see 'Hardware colour calibration' on page 97 for more details — but it may be possible to make an improvement using software tools alone.

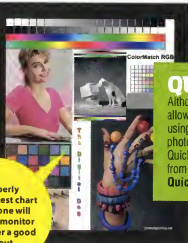
In addition to adjusting the overall gamma value, many graphics cards allow individual adjustment for the primary colours — red, green and blue. Since incorrectly set values are a possible cause of inaccurate colours, this is something quick and easy to try before going to the expense of the hardware solution.

You'll need separate gamma test charts for each primary colour. These are few and far between, but you can find such a test chart at bit.ly/1eecdZD. Bear in mind though, because it's such a dark colour, adjusting the gamma value for blue can be very difficult to do by eye, and it's possible that you could make things worse. If this proves to be the case, you'll have to abandon the idea of adjusting the gamma value for each colour individually and return to adjusting the overall gamma setting instead. 

COMPARE SCREEN AND PRINT

Using the simple methods described here won't result in onscreen images that look identical to how they appear on paper, but it ought to be possible to come close. It might be an interesting exercise to make a comparison before you adjust your monitor and afterwards.

You could use pretty much any image to make this comparison but it's far better to use a properly designed colour test chart. Typically these include all shades of grey, a range of colours at different intensity levels, and a selection of photographs selected to exhibit a wide range of bright hues, plus more subtle colours like skin tones. The colour test chart shown here is well designed to give your monitor and printer a good workout — you can download it from bit.ly/1ge4nd. When you come to print it out, make sure you use glossy photo paper, because colours won't be nearly as intense if you use ordinary copier paper.



QUICK GAMMA

Although most graphics cards allow the gamma to be adjusted using the card's control utility, many photographers recommend the free QuickGamma utility — download it from www.normankoren.com/QuickGammaV2EN.exe.

Troubleshoot PC problems

Mike Williams shows you how to take complete control of your PC's drivers with this powerful diagnostic tool.

YOU'LL NEED THIS...

WINDOWS VISTA OR 7

Ideally you'll need any Windows 7 PC for access to the latest version of the Event Viewer. However, if you've a Windows Vista system then most of what we say will still apply.

DEVICE REMOVER

It will give you a clear picture of what's running on your PC. If you want the very latest version, check bit.ly/1N9TK.

Understanding what's running on your PC at any time is crucial for optimising performance, troubleshooting problems or just about anything else you might want to do. Yet Windows scatters the information you need across a host of different tools, including Task Manager, the Services applet, Device Manager and various system information tools. You don't have to put up with this though, because some very useful third-party tools have appeared to fill the gaps. Device Remover is one of the most comprehensive around.

Device Remover doesn't just show you the programs running on your system – it also lets you explore your devices, drivers and Windows services. Device Remover can quickly point you to the Registry entries for drivers or services to tell you more about them. It can carry out all kinds of actions: choose a service, say, and you'll be able to stop, start, pause, resume, restart, disable, delete or back it up in a couple of clicks.

In case that's not enough, Device Remover is also packed with tools to help you troubleshoot the most complex of PC problems, from power management issues to troublesome broken filter drivers. You need to watch what you're doing: choosing the wrong option in a program this powerful can have undesirable side-effects. You need to have System Restore running and a complete system backup to hand. That said, if you're careful and follow our advice the risks are low, and Device Manager can help you solve all kinds of issues with little effort.

DEVICE MANAGER

Launch Device Remover and you'll see the 'Devices tree' tab, which looks and works a lot like Device Manager. Expand the 'Display adapters' section of the tree, for example, and you should see your graphics card. Click this and its properties will be displayed over on the right: if the device isn't working properly then some of the status messages here might tell you more.

Click 'View > Device remover devices display mode > Show only hidden/detached devices', and the picture becomes more interesting. Expand the 'Non-plug and play driver' section of the tree you'll probably see a host of references to software you thought you'd removed long ago, while other sections – 'Portable devices', say – will include hardware you've not seen in some time.

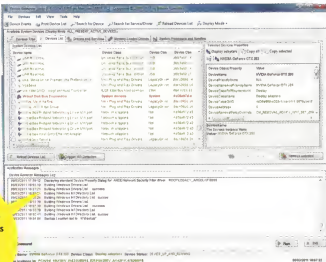
Sometimes these remnants can prevent you from reinstalling a later version of a software package or hardware driver. If you recognise a device or application you're sure isn't installed and you've had problems trying to reinstall, check the devices and press [Delete] to remove them. Be careful, though – if you accidentally remove something important your system could be damaged to the point where it won't even reboot. So choose with extreme care. If in doubt, leave the device alone (it's probably not consuming any system resources so cleaning it up won't help you very much).

Elsewhere, don't miss the 'Print device tree' button on the toolbar. Click this and you'll get a hard copy of

PRINT LISTS

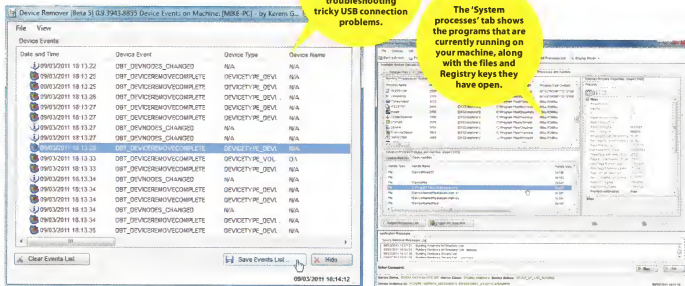
A detailed driver, device or process list may not mean much in itself, but if you print or save these details when your PC is working, then when it isn't, you'll easily be able to see what's changed. Whatever you're viewing in Device Remover, it's worth saving the list occasionally – just click 'File', then 'Print' to print the details out, or 'Export' to save them as a text file for future reference.

Device Remover highlights any faulty drivers it comes across in red, so you can immediately see which devices need your attention.



The Device Events window displays hardware events as they happen, which is very handy for troubleshooting tricky USB connection problems.

The 'System processes' tab shows the programs that are currently running on your machine, along with the files and Registry keys they have open.



your current device tree (spread over many pages – 21 on our test PC). If your system starts misbehaving later, you can use this to identify what might have changed.

There's another useful extra in the form of Device Remover's ability to display device events in real-time. To try this, click the 'Device events' button on the toolbar, then plug in a USB flash drive or similar device and the program will show you what's happening: the device appearing, being recognised, being assigned a driver letter and more.

These event descriptions are technical, but the value comes in seeing an extra layer of information that isn't normally visible. If a USB device isn't recognised, for example, open the 'Device events' window, plug in your hardware and see what happens. The events log may have the clues you need to solve the problem.

DRIVERS AND SERVICES

Clicking Device Remover's 'Drivers and services' tab displays all your installed

Windows services and device drivers. Anything running is displayed in green, while inactive services and drivers are red. Initially the list is sorted by service name, so these will be jumbled up, but if you'd like to focus on the services that are running, for example, just click the 'Service status' column header and Device Remover will rearrange the list.

You'll usually only venture into this tab if there's an issue with a particular service. Does your PC occasionally suffer major printing problems, for instance? It could be something to do with the Print Spooler service: right-click this, select 'Restart' and the service will relaunch itself. Once it's done, try printing again and see if there's any change.

If a service is engaged in resource-hungry activity, you might also be able to click 'Pause' to stop it temporarily (choose 'Continue' later when it's OK to resume). You can even stop a service entirely, but it's unwise to try this unless you're sure it's not doing anything important, otherwise your PC may crash.

Sometimes you might not recognise a service at all. Is it from an application you've uninstalled? Could it be malware? Right-click and you'll find a few options that might help. At the simplest level, you can use 'Show properties', which may reveal details like the author or any copyright messages.

If that's no help, select 'Open Service Binary Location' to display the folder where the service executable file is located, and 'Open Registry key' for related Registry data. Perhaps most useful of all, 'Open online search > Service name' will launch a browser window to display any search engine hits. By default, Device Remover uses Bing, but this can be tweaked: click 'Tools > Options > Application Options' and enter the URL in the 'Application Preferred OnlineSearchEngine' box.

TASK MANAGER

Clicking 'System processes and handles' displays all the processes running on your PC; it's something like

'Restart' is just one of Device Remover's many useful right-click options.

RESTARTING

If there's a problem with one of your drivers, you might start to notice all kinds of odd PC behaviour: unresponsive DVD drives, a screen that's not updating properly, a missing network connection – just about anything could happen.

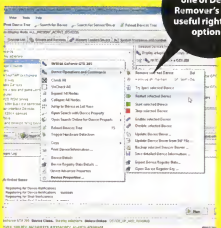
This makes driver problems hard to diagnose, but if you see similar issues repeating with the same device, and it's cured by a reboot, then there could be an issue with the driver.

And you should look to update the driver, if you can. But in the meantime you may be able to fix the problem simply by restarting the device via Device Remover.

To give this a try, click the 'Devices tree'

tab and expand it to track down the problem hardware. Save any unsaved documents, just in case something goes wrong, then right-click the device, select 'Device operations and commands > Restart selected device' and wait to see what happens.

The results can be dramatic. Restarting the graphics adapter on our test Windows PC, for instance, made our taskbar and Explorer windows disappear entirely for a while, until Windows caught up and redrew them. For the most part, though, restarting drivers works just fine, and it can often fix problems without the hassle of a full reboot.



Device Remover
tells you
everything you'll
ever need to
know about your
drivers.

FIND OUT MORE

If you need to find out more about a device or its driver, Device Manager will probably be your first port of call. You'll get better results from Device Remover, though — it's packed with information.

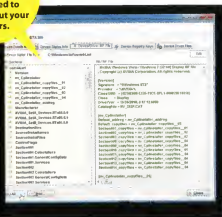
To see for yourself, click the 'Devices tree' tab, expand the 'Display adapters' tree, right-click your graphics card and click 'Device details'. The resulting dialog is far too small for all the data it contains, so resize it to fill the whole width of your screen, then try browsing the tabs to see what's on offer.

Ever wondered which files are included with

a driver? They're all listed in the 'Device driver files' tab, along with paths, company names, descriptions and version details.

The 'Device Registry Keys' tab shows you all the Registry keys associated with a driver. This may give you access to settings that you can't tweak in any other way, but be careful — using incorrect values may crash the driver and your PC, and may stop it from booting.

The 'Device details info' tab lists information about the driver, its capabilities and status. It's very useful for troubleshooting.



HIDE TOOLTIPS

Move the mouse cursor around in Device Remover and you'll often see huge tooltips. While these are informative, they can become annoying. Fortunately, if you don't like them, they're easy to turn off: click 'Tools > Options', check the Application User Interface section, and set Don'tShowApplication ToolTipBalloons (yes, 'Balloons' not 'Balloons') to True.

the Device Remover version of Task Manager, with some handy extras.

Choosing a program will display more information in the right-hand Process box, for example (there are 20 memory-related figures). The 'Loaded modules' box will show you all the DLLs and related files a process is using, while the 'Open handles' box displays any files and Registry keys it has open. You can also right-click the program and choose an 'Open online search' option.

If it's something undesirable, hopefully you'll be able to uninstall it. But if the process is malware and stubbornly resists, a right-click 'Mark file for deletion on system boot' should wipe it out when you next restart.

'Backup all modules for process' is another unusual right-click option which creates an archive file based on a process executable and all its dependent DLLs. You might then be able to use this to run an application on another PC, even if you don't have an installer for it.

There are even a few window manipulation options. Would you like your Firefox window to be 'always on top' of other app windows? Device Remover allows you to do this.

BONUS TOOLS

There's no shortage of diagnostic power here, but Device Remover has even more to offer in the form of some unusual system tools. Broken filter drivers, for instance, can cause some odd PC behaviour, particularly with optical drives: Windows may suddenly think your DVD writer is a DVD ROM, say, or stop recognising the drive altogether. Clicking 'Tools > System > Show filtered devices' lets you browse the filter drivers on your system, and a 'Try to find bad/broken filters' dialog will attempt to locate any that aren't working.

Elsewhere, a 'Show device power states' dialog displays power-related information relating to each of your devices: it's technical stuff, but if, say, some item of hardware isn't

waking up properly after a restart from a sleep state, this may help you figure out why. And by right-clicking a device you can even send it a 'wake up' request manually, which might be enough to get it working again.

There's also 'Back up all memory loaded drivers' — an easy way to back up your drivers that could be handy if you want to reinstall Windows. Advanced tools include a WMI/WQL Query interface, a Windows Protected Resources browser and a 'Translate Windows error codes' applet that takes those strings of numbers and explains what they mean.

There are also quick shortcuts to more than 50 useful Windows tools, so whether you want to launch a Control Panel applet, open the command line or just create a system restore point, you'll find an appropriate option somewhere on the Tools menu.

If this sounds overwhelming, you're right — Device Remover's array of tools can be confusing. But you don't have to use every feature. Any one module — the ability to watch device events in real-time, for example — could be enough to help you solve a tricky problem. Don't worry about the apparent complexity — download a copy, give it a try and find out just what it can do for you and your PC. www.device-remover.com

BACK UP YOUR DRIVERS

Do you have up-to-date copies of all your drivers to hand in case of an emergency? If not, then you could run into problems, especially if you need to reinstall Windows: even if it can find drivers for all your hardware, there's no guarantee they'll be the latest or most appropriate versions. So it pays to make a driver backup occasionally, and Device Remover comes with a tool to make this very easy.

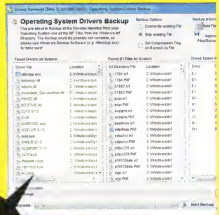
You should start by connecting all your devices to ensure Windows loads the drivers for them. If you can't — because your PC doesn't have enough USB ports, for example — then plug in the most complex first. So connect your scanners, printers or external TV tuners, but

ignore USB flash drives because Windows will access those natively.

When you've got everything working, launch Device Remover and click 'Tools > System > Back up all running memory loaded drivers'.

Click 'Set backup location' and decide where you'd like the files to be saved (ideally create a new folder specifically to hold them).

Finally, click 'Start backup', then sit back and watch as the program backs up your drivers. It won't take long, and if you do have any problems later on, then the backup could save you a great deal of hassle.



Back up all your
third-party
drivers in just
a few clicks.

Hyperlink the real world

Mike Bedford learns to use QR codes, the craze that started in Japan and is now gaining ground around the world.

YOU'LL NEED THIS...

ONLINE UTILITIES

You don't need to download any software to generate QR codes or decode them. We'll be using online utilities you can find at bit.ly/g2air6 and bit.ly/jmcsdk.

I-NIGMA QR READER

If your mobile phone didn't come with a QR code reader, you'll need to install one. I-nigma is a free one that's supported by many phones.

Clicking on hyperlinks to navigate from page to page is second nature to web users. This principle transformed the internet of the '80s from a specialist resource for academics to the mass market phenomenon it is today. But while you rarely have to type a URL when you're surfing the web, this level of convenience is lost if your starting point is a printed document. URLs appear on everything from business cards and magazine articles to giant billboards, but going to the web page in question involves typing in a long string of characters. QR codes aim to bring the concept of hyperlinking to the printed word and real world objects.

The principle is simple – capture a graphical code with the camera on a mobile device and you're taken to the associated web site automatically. In this introduction to QR codes, we'll show you how to generate them and use them in your documents, and how to use free apps to decode them on your PC, or display the related web site on your mobile phone or tablet.

INTRODUCING QR CODES

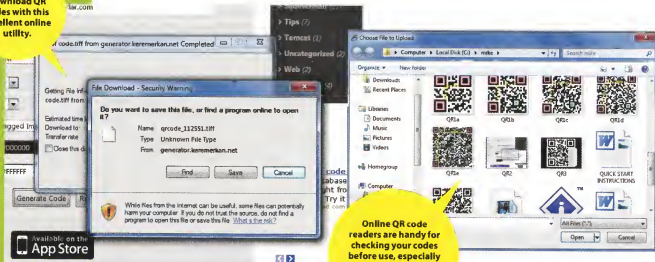
A QR code (QR stands for 'quick response') takes the concept of the barcode and extends it from one to two dimensions; indeed, the phrase '2D barcode' is commonly used to describe it and similar codes. As the name suggests, an ordinary barcode that you might find on a tin of beans comprises black and white vertical bars, which are read using a laser beam that scans in a single direction. A QR code is made up of black and white

squares arranged as a matrix, which is read in two directions. This is normally achieved by capturing an image of the code and then using software to scan it.

QR codes can be various sizes depending how much data is encoded. These are referred to as versions, and range from Version 1 (a 21 x 21 matrix) to Version 40 (a 177 x 177 matrix). Each is four squares wider and four squares taller than the previous one. The targets in three of the four corners (shaded pink in our diagram, but normally black and white) are known as the finder patterns. The software uses these to recognise a QR code and determine the orientation at which it's been photographed. The smaller target(s) (blue in our diagram on page 103) are referred to as alignment patterns. These are used by the software to correct any distortions caused by the paper not being flat, for example. You'll also notice that the three finder patterns are joined by two lines of squares (yellow in our diagram), which are always alternately black and white. These are known as timer patterns, and are used to define the positions of each row and column of squares in the code.

QR codes can store lots of different types of data, including decimal numeric, binary and Japanese Kanji characters, but for this project we'll be focusing on the alphanumeric characters needed to encode URLs. In addition to real data, QR codes also contain data for detecting and correcting errors caused by tears, scratches and marks. There are four types of error correction, referred to as levels L, M, Q and H. They

You can download QR codes with this excellent online utility.



QR codes come in various sizes, but the basic features are common to all.

You can add colour to QR codes as long as there's still enough contrast.



USE MOBILE PAGES

If you use QR codes to direct people to your web site, remember that most people will snap your code and visit the resulting site on a mobile phone. Give some thought to how easy your site will be to view and navigate on a small screen and, if necessary, use the URL of a special part of your site that's optimised for mobile phones.

CAPTURE A QR CODE WITH A MOBILE DEVICE AND BINGO! IT LEADS TO A URL

permit errors to be corrected if 7%, 15%, 25% or 30% of the code has been obliterated. There's a trade-off between error correction and the amount of data that can be stored in a code. If we take the tiny Version 1 code, 17, 14, 11 and 7 alphanumeric characters can be accommodated at levels L, M, Q and H. It depends on the length of the URL and the error correction level selected, but URLs will often end up as either Version 2 (25 x 25) or 3 (29 x 29) QR codes.

GENERATING QR CODES

Online utilities for generating QR codes are plentiful, but many of them don't offer a full range of options. The one we've chosen was written by Kerem Erkan, and is available at bit.ly/q7dtrG. There are other options you might like to try later, but to start, try creating a QR code for a URL. This is the default setting, so just enter the URL in the 'Website URL' box. Enter the URL in full,

including the 'http://', which is already filled in. If you don't, some QR code readers won't recognise it as a URL rather than, say, an email address, phone or SMS number, all of which can also be encoded in a QR code. Select the required error correction level and output type from the appropriate menus, and click 'Generate code'.

The code will be generated and, if you chose PNG as the output format, it will be displayed at full screen, using the smallest version that can accommodate your URL at the specified error correction level. Right-click it and select 'Save picture as' from the dropdown menu to save it to file, left-clicking outside the code afterwards if you want to return to the previous page to generate another code.

For any of the other output formats, a 'File download' dialog box will appear when you click 'Generate code', after which you can proceed normally.

Unless you want to make a feature of your QR code – as a motif on a T-shirt, for example – you'll want to keep your code as small as possible. However, if you print it below the recommended size, it may not be decipherable by all readers. The only reliable ways to minimise the size, therefore, are to use a lower error correction level or to use short URLs. For this reason you might want to consider using a URL shortening service like www.bit.ly.

With our recommended QR code generator, you don't even have to visit these sites – just select the required shortening service from the dropdown menu.

USING QR CODES

Once you've got your QR code saved as a PNG, SVG or TIF file, you can include it in a document in just the same way as you'd incorporate any other image. However, there are a few points you should bear in mind.

RUBIK'S CODES

If solving the Rubik's cube in the conventional way isn't enough of a challenge for you, how about slacking 49 of them together to create a 21 x 21 square QR code? You wouldn't be the first to give it a go — web designer Ape10 did exactly that to publicise his new social game *Mela Assassins* (bit.ly/txWkrt).

QR CODE CULTURE

QR codes first hit the big time in Japan, and while they've been slower to take off in the rest of the world, you'll start to see them here. One of the first high-profile uses was for the UK BBC's *Coast* TV series, recently screened here in Australia. Walks were created to accompany the series, with information plaques installed at points of interest. Each plaque featured a QR code, which provided access to audio clips, photos and facts about the location.

Despite their growth in popularity, QR codes on retail packaging are still few and far between, with Pepsi Max and Absolut Vodka some of the few brands embracing the technology. You don't have to wait for the retailers to catch up with the technology, though. Take a look at the custom QR code T-shirts at www.codeshirts.com direct people to your Twitter account, Facebook page or blog — as long as you're not camera shy.

SNAP QR CODES WITH YOUR MOBILE PHONE

In Japan, most phones come with a QR code reader pre-installed. Although this is gradually becoming more common elsewhere, you probably won't have the necessary app to hand immediately. If you come into this category, though, readers are available for many of the more popular phones and they're often free. Here we see how you can install and use the i-nigma QR code reader.

Using your phone's web browser, go to the i-nigma mobile site at www.i-nigma.mobi.

If your make and model is supported, it will be identified and a download link displayed. Click on the link and proceed with the download. When it's finished you'll be asked if you want to open the file and, although you can run i-nigma later, you might as well continue now to try out the reader.

With i-nigma running, point the phone's camera at a QR code and move in until it occupies 80-100% of the screen before pressing the indicated button (which will depend on

your phone). Your phone might ask you to confirm that you're happy to allow i-nigma to use the camera, in which case you should agree. i-nigma will now identify the QR code and zoom in on it. As long as the code is large enough and not out of focus, you'll be shown the decoded URL (or it could be an email address, a text message or a phone number) and asked if you want to go online (or send an email or text or dial the number). Confirm this to go to the web site represented by the QR code.

First, you need to size the code so that it's at least 32 x 32mm when printed out. As the cameras in phones continue to improve, this minimum size requirement will come down. At the time of writing, it's estimated that 90% of phones on the market can handle a 26 x 26mm code.

Second, note that every QR code image always includes a one-square white border. This border is an integral part of the code (although the minimum recommended size doesn't include it) and you should make sure nothing encroaches into it.

Although QR codes are intended for use with a mobile device like a phone, it's also possible to decode them on a PC. This would be useful, for example, if you edit a newsletter or are working on some document to which others have contributed, and you want to be able to check any QR codes. It's also useful if you're creating a customised QR code and want to check that it's still readable afterwards.

There are several online readers that all do much the same sort of thing – we used the one at www.onlinebarcode reader.com which, in addition to QR codes, can also decode other types of barcodes of both the 1D and 2D varieties. Note, though, that this

decoder (and the popular one at zxing.org/w/decode.jsp) will currently work with coloured JPGs, but not coloured TIFFs, presumably due to a glitch.

CUSTOM QR CODES

Although QR codes are functional items, they can be customised to make them reflect a corporate image, appear as a work of art in its own right, or fit in with the colour scheme or style of a document. Remember, moving away from a pure QR code will make it more difficult to read, so don't overdo it.

One simple method of customisation is to choose a colour scheme other than black on white. Our recommended QR code generator lets you choose alternative

foreground and background colours.

A second method is to make some of the white squares black and vice versa to include a crude graphic image, like a logo. This is possible because of the error correction feature of QR codes, so bear in mind how much code at each error correction level can be altered while remaining readable. Also remember that if you 'use up' some of the error correction scope in this way, the code will be more vulnerable to the effects of subsequent accidental damage.

A third way to customise QR codes involves clearing a small area from the centre of the code and dropping a high-resolution image into it. Again, bear in mind error correction. Finally, you could create a pattern or image by altering some or all of the black squares to other dark colours and white to light colours.

Whenever you customise a QR code, make sure it's still readable using our QR code decoder. Bear in mind that this decoder represents ideal conditions, so even if it can decode your modified code, it would be a good idea to then print it out and try it out using a mobile phone as well, just to make sure. www.zxing.org

CUSTOM GALLERIES

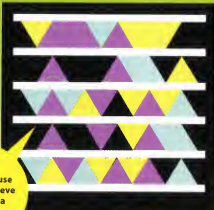
If you're looking for a bit more inspiration for customising your QR codes, take a look at the innovative codes at qrarts.com, which have been produced for the company's clients. You'll find another excellent gallery at bit.ly/KCQLBT.

OTHER 2D BARCODES

The QR code isn't the only type of 2D barcode by any means. Another important one is the Datamatrix code, although you're not likely to find it on product packaging or posters. Instead it's used mainly for industrial and warehouse use and you might see it on the address label of parcels. You can recognise a Datamatrix code by the solid line of black squares along the left and bottom edges, which form an L-shaped finder pattern. Larger codes may include several horizontal and vertical solid black lines included throughout the pattern.

The HCCB (High Capacity Colour Barcode), otherwise known as the Microsoft Tag, is a

Microsoft-developed 2D barcode. It's particularly interesting because it uses triangles instead of squares and, as the name suggests, those triangles are colour-coded. By employing four or eight colours instead of just black and white, more data can be crammed into the available space. You're only likely to encounter HCCB codes on the packaging of movies and video games, where they serve much the same purpose as QR codes. Online encoders and decoders for mobile devices are available if you're interested in trying them out yourself.



the latest how-tos, previews & news



Sync everything online

Windows Live Mesh 2011 is the simplest way to sync your files across multiple PCs and locations. **James Stables** shows you how.

YOU'LL NEED THIS

WINDOWS LIVE MESH 2011

This tool lets you synchronize files across your computers, connect to your PC remotely and sync program settings. You can get the client from download.live.com.

Most of us use more than one PC these days, and if you count up the different machines you use on a weekly basis, they can easily reach double figures. You might have two or three machines in the house, and then a work PC as well. If you add that to the PCs owned by friends, family and colleagues, and machines found in libraries and internet cafes, you can start to see a trend emerging.

The upshot of this trend for PC polygamy is a disconnection between the computers we use and the files we need. Anecdotal, many people will find themselves in a situation where a file they were working on is stuck on their home PC while they're at work, or vice versa. Not having your files when you need them can be incredibly frustrating, but online storage and syncing can cut the worry and keep your files at your fingertips. We've covered online storage services before, but Microsoft's Windows Live Mesh 2011 has been revamped to offer its users something different.

Unlike most online storage services, Live Mesh 2011 is designed to sync files between your PCs, taking the effort out of storage. Like a lot of other companies, Microsoft has its own online storage service, called Windows Live SkyDrive, but Live Mesh is different. Its job is to fill the gap between your locally stored PC content and the other PCs you use by creating automatically syncing folders.

GETTING STARTED

To get started with Live Mesh, you need to download the client onto your PC. To do that, go to download.live.com and download the Windows Live Essentials 2011 client. The installer will ask you which of the family of programs you want to install, but you only need Live Mesh to start syncing your data. You'll also need a Windows Live ID. This is the key to bringing in cloud services like SkyDrive, which are used behind the scenes.

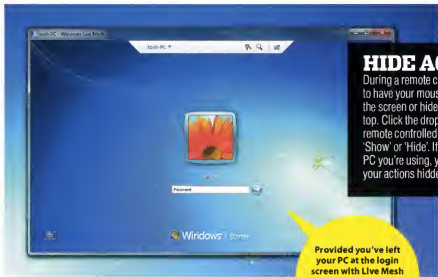
Once Live Mesh is installed and you've signed in with a Windows Live ID, you can start syncing your files. In the main window, choose 'Sync a folder' beneath the name of your PC. A dialog box will open and you can choose any existing folder or library from your PC. If you'd rather not have everything from these folders sprayed onto the internet, you can create a Live Mesh folder locally on your PC. Anything added to this folder will be automatically synced to the web. SkyDrive, the service Live Mesh uses to store your files, has a 5GB limit, so if you have extensive libraries, you may want to be selective.

UPLOAD YOUR FILES

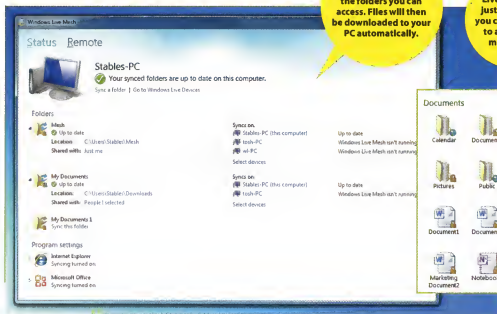
Once you've designated a folder, Live Mesh will sync it and all of your files will be uploaded to the cloud. Once this process has finished, the newly synced folder will have a green tick placed next to it to show that everything is now up to date.

HIDE ACTIONS

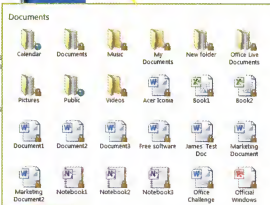
During a remote connection, you can choose to have your mouse movements show up on the screen or hide them from the menu at the top. Click the dropdown menu next to the remote controlled PC's name and choose 'Show' or 'Hide'. If someone else can see the PC you're using, you might want to keep your actions hidden to avoid confusion.



Provided you've left your PC at the login screen with Live Mesh active, you'll be able to log in from anywhere in the world, whenever you want.



Live Mesh isn't just for work – you can also use it to access your media files.



Once a folder is synced in Live Mesh, you can then start to do more with it. In the main Live Mesh console, click one of your synced folders to adjust who can see and share it. This lets you give other web users access to certain folders, even if they don't use Live Mesh. The ability to set public folders has long been a feature of SkyDrive, and guests are able to access this area of your online storage space provided they also use a Windows Live ID.

After your first PC is synced with Live Mesh, you can start adding other PCs. The best way is to install the client on the other PCs you use, and sign in with your Windows Live ID. When you log in on another PC, you'll see all the folders that have been synced with your account at the top of your screen. You can then choose to have the folders synced with your PC so they appear among your other files as normal. To do this, click one of the folders and a box will appear, letting you choose a folder from your local PC with which to sync the Live Mesh content. This can be any existing folder, like 'My Documents', but

you can create a new one if you want the synced content to stay separate.

If you're using a PC without the client installed, go to skydrive.live.com from any PC or mobile device to retrieve it. While it might seem cumbersome to use SkyDrive to access files you synced using Live Mesh, it means you don't need to have client software installed at the other end to access your files – perfect for locked-down corporate networks.

Unfortunately, there's no provision yet for syncing to other services like Dropbox, so if you want to take advantage of Live Mesh, you need to use SkyDrive. This is something Microsoft would do well to change, because Mesh is a great service that gains nothing by being tied to SkyDrive, which is adequate at best.

SYNCING SETTINGS

Live Mesh doesn't just deal with your files – it can sync your settings as well. This is one of the most innovative yet simple parts of the service, and essential for anyone who's

DELETE DEVICES

If you no longer want a device to be listed in Live Mesh, you can easily delete it. Click the 'Devices' link in the Live Mesh console and the list will be displayed in a browser window. Click 'Manage' next to any device to remove it from your circle of devices.

particular about the way their PC works. Live Mesh can save settings from Internet Explorer and Microsoft Office, which can be synced to other PCs.

Syncing your Internet Explorer settings may sound duller than a fortnight in Canberra, but it lets you port your favourites and bookmarks from one PC to the other as if by magic. This means that any web page you find while at work will be accessible from your home PC, so there's no need to hunt for information you've already found. In Office the syncing goes further, extending to templates, dictionary entries and email signatures.

PERSONALISE YOUR DEVICES

With a host of Windows Live compatible devices now on offer, the Live Mesh console provides you with an easy way to manage and personalise them. Click on the 'Devices' link in the console and you'll be presented with a list of systems that have been linked to your Windows Live ID. This list will be populated by all the PCs and Macs using Live Mesh, and if you own a Windows Phone 7 device, this will appear here as well. Your SkyDrive account will appear as a device

too, albeit a virtual one. Click any device in the list to change its name. For example, your PC might be called something nondescript, so you could begin by trying something more memorable. You can also give the PC a different icon, which might be more representative of the device. There are different ones for phones, laptops and all-in-one PCs. You can also access Windows Phone 7 options from this screen, like tracking it on a map or ringing it if it's lost.



FILE SHARING

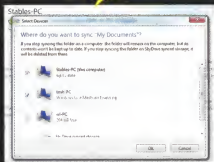
Once you've got yourself set up with Live Mesh, and your circle of PCs has been added and enabled with the client software, you can start to fine-tune your syncing so you're in full control of your information. After you've made a folder available to be synced, you can tell Live Mesh manually which PCs you want to access it.

Choose one of the synced folders from the list in Live Mesh, then click on it to expand more options. Now, on the right-hand side of the screen, click 'Select devices'. A new option menu will

appear, with a list of every device in your circle. Click the tick box to have that folder synced to the device, or leave it blank if you don't want it to be listed.

It doesn't matter if the PC you want to sync with isn't switched on, because the updated content will be sent as soon as you log in on the second computer. However, the original PC (where the files are) will need to be logged into Live Mesh when you do so. The beauty of organising your files this way is that you don't have to use SkyDrive to sync them.

With Live Mesh, folders can be synced on any of your PCs, giving you total control.



To enable settings syncing, you need the Live Mesh client installed on every PC on which you want the settings to appear. On your main PC, install the Live Mesh client and a list of supported programs will appear under 'Program settings'. You can choose to enable these individually by clicking on the program name and choosing 'Turn on'. Once the client is installed on another PC, log in with your Windows Live ID and turn on syncing.

REMOTE CONNECTIONS

One of the best features of Live Mesh is the ability to remote-connect and share the screens of computers within your Windows Live circle. This has plenty of benefits, like the ability to access your files from anywhere in the world, or help family members overcome PC problems without having to go round and listen to their explanations.

To share screens remotely, you need to do a little prep. First, you need to have the client software installed on both PCs, and be logged in on both with your Windows Live ID. When a PC is connected for the first time, it's added to the list of devices in the Live Mesh console, although it's greyed out initially.

GET MORE INFO

You can get a detailed view of the folders that are synced to your PC by clicking its name in the Live Mesh console. You'll be taken to a special browser page in Windows Live, which will outline every folder that's been synced. You can see how much space is left on your physical drives, as well as online ones.

To bring these devices to life, you need to activate remote sharing. In the Live Mesh console, click the 'Remote' button at the top to be taken to a special menu. Click the 'Turn on remote connections' link at the top to allow other PCs to connect to yours. Your Windows account needs to be password-protected.

Once you've enabled remote connections on two PCs, you can share screens. Choose one of the PCs and click 'Connect to this PC'. A new window will appear while the connection is made, which can take around a minute. If the PC is logged in to an account, you need permission from the person using it to connect. If the remote PC is logged in to

Live Mesh and left at the password screen, you can take control instantly. You'll need to use the machine's password to log in, as if you'd just turned the machine on.

When the connection is made, the remote machine's desktop will appear in the window and you can browse as if you were in front of it. You can launch any program, although as with any remote connection software, the refresh rate is slow and the screen will be jerky to use. You also can't make your local PC interact with the remote one directly, so if you want to retrieve files you'll need to send them as if you were at the remote PC.

Live Mesh isn't the most advanced or customisable syncing program available, but it's one of the easiest to use. The remote access features are some of the best we've seen, and if you need to access your PC online it's well worth checking out.

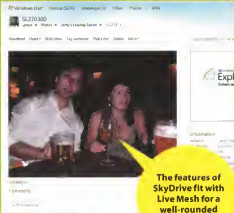
If you're looking to do more with syncing, Dropbox is fantastic and offers support for mobile devices, which Live Mesh lacks. Windows Phone 7 users can take advantage of extra syncing though, and with Microsoft developing its Windows Live suite so rapidly, we'll be keeping a close eye on what's coming next. [GUTS](#)

GET MORE FROM SKYDRIVE

When Windows Live SkyDrive was released back in 2007, it was regarded as one of the least glamorous parts of the Windows Live setup. It was hobbled by slow speeds, low storage and an awkward interface, but now the service has been revamped, with capacity boosted to 5GB free of charge. What's more, it now provides the back end of a host of great new services, so it's well worth a second look. One great feature that's been added to the service is Office Web Apps. The online versions of Word, Excel and PowerPoint let you open and amend any document stored on SkyDrive, much like Google Docs. What's more, there's more

synergy with the full versions of the Office suite, and Office 2010 users can use SkyDrive as a virtual storage location, meaning you don't even need to use your web browser to take advantage of it.

Photographers are also well catered for in SkyDrive. Once images are stored on the service, you can start to get more from them. Place photos in a publicly accessible folder (which you can set by clicking 'Sharing-Edit permissions') and you can tag other Windows Live users, embed images into web sites using the supplied code, or email people a link so they can view them from your SkyDrive account.



Sharpen your photos

The unsharp mask can be the most useful tool in your palette, as long as you don't overuse it, says **Dave Stevenson**.

YOU'LL NEED THIS...

PHOTO EDITING SOFTWARE

Everything from GIMP to full-on Photoshop CS5 will do the trick. If it's a photo editor, it will have an unsharp mask tool.

Focus is one of the most important things to get right when taking a photo. Other imperfections, like exposure, white balance and even compositional problems such as distracting backgrounds can be removed or corrected, but an image lacking sharpness is nearly impossible to fix.

There are steps you can take to avoid this, like learning how to use your camera's autofocus system and ensure it's working as efficiently as possible. But even with the best will in the world, you'll probably find that some of your images aren't quite as sharp as you'd like.

In an ideal world, you'd return to the place you took your photo and have another go, but that isn't always an option. Your image may be soft because of the quality of your lens, or because your camera applies aggressive noise-reduction (see 'Reduce noise').

Luckily, software can come to the rescue. Virtually all photo editors, from the free to the very expensive, come with ways to sharpen your images. The trick is knowing how – and in this case when – to use them.

CHOOSING YOUR SHOT

The most crucial thing to understand is that sharpening can't save a totally unfocused image. If you're looking at a picture in which your camera's lens hasn't correctly identified and focused on the subject, it's time to throw it away. Contrary to what you see on TV, software can't create detail that wasn't there in the first place.

However, images can be soft for a number of other reasons, and if you choose your battles carefully you'll

be able to salvage a surprising number of shots by sharpening them. For example, if you own a compact camera it's likely that your shots are soft thanks to noise reduction or simply the effect of cramming millions of tiny sites onto a sensor. If you own entry-level DSLR lenses, you might find that no matter how perfect the focusing, imperfections within the lens result in shots that look fine on your camera's screen, but seem soft when printed at large sizes.

Choosing your shot involves understanding the difference between an unfocused shot and a soft one. If you can do this, you'll be much more successful. The ability to sharpen images is common to a huge range of photo editors. Whether you've spent hundreds of dollars on the full version of Photoshop, economised with Paint Shop Pro Photo X3 or Photoshop Elements, or taken the free route with GIMP or an online editor like Picnik (www.picnik.com), you'll almost certainly have access to a reasonable sharpening tool. How flexible that tool will be is another matter. In Picasa (www.google.com/picasa), all you get is a simple slider. Other applications give you a proper unsharp mask tool.

Your requirements depend on how much work your images need and what you intend to do with them. If you want to print at small sizes or publish images online, any sharpening work you do is likely to be wasted. If, on the other hand, you want to print A3 images or larger, you may need to apply sharpening very carefully to get the best from your work without overdoing it.



ADJUST ISO

If your images are turning out soft, try dropping the ISO your camera uses. This reduces the sensitivity of the sensor. While this will mean longer exposure times (try to prop your camera on something), less noise will be generated and your images should look better.

The most successful candidates for sharpening are images that are nearly perfect, and just need a careful nudge from a decent piece of software.

CROPPING

Sharpening is particularly handy when you're cropping an image. Most consumer camera lenses are designed to produce very good image quality when images are used in their entirety. As soon as you begin to enlarge parts of your image though, you might find artefacts caused by defects in your lens — soft area, purple fringing and so on — come to the forefront. The amount you can crop into and image is affected greatly by the quality of the lens — a professional lens will produce sharper results and allow for more cropping. The shot

of a swan below, for instance, was taken with a decent quality mid-range interchangeable lens camera, then cropped aggressively to make the swan more of a focal point. In its original, unsharp state there's a lack of definition that will make the image look poor when printed. Applying a judicious unsharp mask allows us to print the image at a far greater range of sizes.

It's unlikely that you'll need to apply sharpening like this to every single image you take, but on particularly large crops it's an indispensable tool.



The crop tool can help you improve a shot's composition, but you may need to apply sharpening afterwards.

GETTING GOING

Of all the things you can do to your image, sharpening is perhaps the area where you need to tread most carefully. Many of the edits you can make — changing curves, colour correction and so on — will look obviously wrong if you overdo them.

However, over-sharpening sometimes only looks terrible once it's printed, and you might not realise you've gone overboard until your image comes back from the printer. A good rule of thumb is that if you can tell that an image has been sharpened as you view the entire shot on screen, you've probably done too much. An over-sharpened image might have had a new texture added to areas that should be smooth, or you might find entire objects — particularly those against plain backgrounds — have pale, shimmering halos, making them look obviously fake. Either

way, it will be obvious your image has been doctored.

When you open the unsharp mask filter, you'll find three controls — 'Radius', 'Amount' and 'Threshold'. The 'Radius' control affects how much of your image is sharpened beyond the pixels that make an edge; keep this number fairly low. The 'Amount' slider affects how heavily your filter will be applied, while the 'Threshold' slider determines how different pixels need to be from their neighbours before the filter is applied at all.

HOW IT WORKS

Like many edits you can make to your images, sharpening is a hugely complicated instruction based on a fairly simple premise. Put simply, when you use a sharpening tool on your work, your editing application looks for the edges in your images and boosts their contrast to



Subjects with lots of fine detail — like the shaggy hair on this Highland cow — can look particularly poor if you don't get the sharpness spot-on.

HARD PROOFS

It's always worth printing a hard proof of your work, particularly if you're planning to spend serious money getting it printed. Do a good-quality A4 print and check that your sharpening hasn't introduced new errors. This is also a good way to spot other hitherto unseen defects in your image.

make them appear starker. The more complex explanation is that your editor looks for pixels in your image that are significantly different from other pixels nearby, and makes them darker or lighter to increase their contrast.

The theory is that the edges in your image are enhanced, but plain areas of colour or smooth gradations are left alone. This is particularly important if you're working with an image that contains significant amounts of noise or grain — the last thing you want to do is apply sharpening to bits of the image you wish weren't there in the first place.

The most useful tool at your disposal is usually the unsharp mask. The name suggests that this will blur your image — which is partly true. It works by creating a blurred version of your image, then comparing it to the original, using it to detect the areas where it needs to boost contrast. [BUT](#)

REDUCE NOISE

Most cameras come with a technology called noise reduction. Noise is a visual byproduct of the heat and static electricity your camera's sensor generates while it's capturing an image. Noise makes images grainy and speckled, and in some cases it can be multi-coloured. The longer your sensor is operating (the longer the exposure), or the higher its sensitivity (if you're shooting at night at a high ISO, for instance), the worse the

noise will be. The small sensors in compact cameras exacerbate the problem, because they have a staggering number of components on a tiny chip, all of which are producing interference.

To get around this problem, many cameras apply automatic noise reduction, which attempts to smooth over the interference. Unfortunately, this also has an effect on the underlying image, and can result in pictures that are obviously

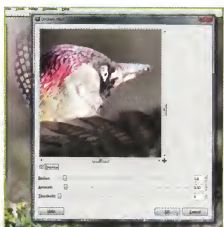
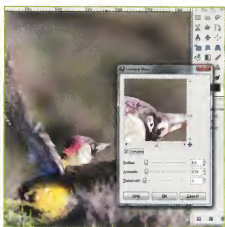
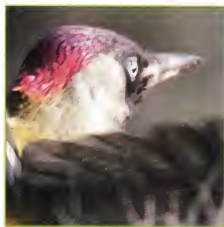
digital. The more you crop the pictures, the worse your image will appear.

It's worth digging through your camera's settings to see if you can turn noise reduction off. The result will be images with more grain, but you'll get sharper results. You can then apply as much sharpening and noise reduction as you like in post-production, rather than relying on your camera to do it on the fly.

**6
STEPS**

HOW TO USE UNSHARP MASK

Turn a soft-looking shot into something worth printing with just a few clicks.



1 CHECK YOUR IMAGE

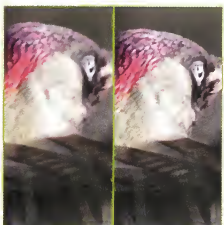
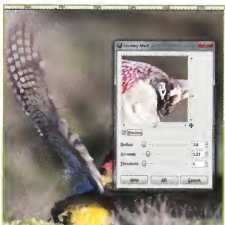
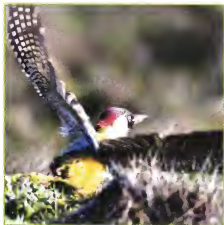
Pick your image carefully — remember that unfocused and soft images are different things. In this case, we have an image that's a crop of a larger frame. It's focused, but the cropping has introduced some softness that we need to remove before the shot can be printed at a large size. Zooming in to the image to 100% reveals that the critical area — the woodpecker's eye — could use a little more definition.

2 FIND THE UNSHARP MASK FILTER

In applications like GIMP and Photoshop, the sharpen tool is a filter. We're using GIMP, but the terminology is standard. Click 'Filters', then choose 'Enhance', then 'Unsharp mask'. Now drag the image preview to a crucial part of the image. You can either click on the preview and drag out a box around the area you want to sharpen, or click the small four-direction arrow to the bottom right and navigate with that.

3 PREVIEW YOUR WORK

In Photoshop, any changes you make in the Unsharp Mask dialog are previewed in the main image, but this isn't the case in GIMP. To get a better idea of what you're doing as you're doing it, click and drag the dialog box so it fills more of the screen and lets you see more of your image at once. In an image like this one, which is generally sharp but just needs a nudge, keep the filter's radius setting very low.



4 DON'T OVERDO IT

This over-sharpening has cost us lots of detail, particularly in areas that were already light. When sharpening photos, a bit of experience comes in handy — not least because it will help you to separate images that will look better after sharpening from the lost causes. Over-sharpened images suffer a variety of defects, and like halos around prominent subjects, and in the worst cases, entirely new textures.

5 CHECK, SAVE, UNDO

In most cases, you'll want to apply the lightest touch you can — enough to see the difference in your shot when it's zoomed in to 100%, but not enough that it's really noticeable when you fit the entire image on your screen. It's best to work with a TIFF or other uncompressed format, which won't lose image quality when saved. Remember, you can always undo sharpening you're unhappy with.

6 OUTPUT TO JPG

Comparing the before and after images reveals the tiniest difference on screen, but there's definite improvement around the eye of the woodpecker. Although the effect might look minimal on screen, it will make all the difference when the shot is printed at high quality. You should note that even this small amount of sharpening has increased the amount of noise, or grain, in the background of the image.

Pick a web site colour scheme

Coming up with web site palettes is easy when you've got a bit of colour theory under your belt. **Karl Hodge** grabs his colour wheel.

YOU'LL NEED THIS

A WEB BROWSER

All the tools and information available as web apps — you don't need to download any software.

Picking appropriate colours for your web site is one of the most important design decisions you can make. People decide whether to stay on a site within seconds. If you've got the mix wrong — too garish, too dull or merely giving the wrong impression — you may have lost them before they've had a chance to look at your content.

The problem is, not everyone has the gift of colour mixing. It's thought of as an art — the sort of thing that painters and interior designers are adept at — but when you look more deeply into the theory, it turns out it's more of a science. It has rules that can be translated into algorithms, which means we can build applications that help us pick colour schemes.

We're going to take a closer look at the theory behind picking colours for your web site, and introduce you to some of the tools that'll help you create sites that are truly pleasing to the eye.

COLOUR THEORY

Can good taste be taught? With colour theory, we can explain why some hues work better together, why context matters and how colour can communicate different messages to our site visitors.

If you can't remember back to school art lessons, we divide colours into three types: primary, secondary and tertiary. The primary colours are red, yellow and blue (not the red, green and blue of optical colour divisions). If you mix two of these colours in equal measure, you get

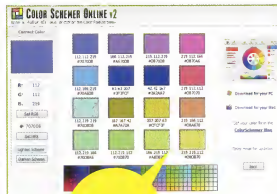
one of the secondary colours: greens, oranges and purples. Tertiary colours are then derived from mixing a secondary and primary colour in equal measure. Why does this matter? Because this is the process from which the colour wheel is derived — a chart that shows the relationships between colours. Colours are placed on the wheel clockwise, with yellow at the top, then red, then blue. The secondary colour made by mixing two hues is placed between them.

From this colour wheel, we can match colours that work well. The two main relationships are complementary and analogous. Complementary colours sit opposite each other on the colour wheel. If you're making a bold statement, a complementary colour scheme is the way to go. Analogous colour schemes are more subtle, and are composed of hues that sit beside or near each other on the colour wheel.

COLOUR PSYCHOLOGY

Designers also use colour warmth to choose schemes. Warm colours like red, orange and bright yellow pop out of the schemes they're used in, while cool blues and greens recede. In the middle are neutral creams and beiges. If you use a colour scheme with blues and reds, the blues should be used in backgrounds, and the reds in headers and buttons.

Choosing a colour scheme is part of your branding process — the colours you pick immediately say



Kissmetrics has found that colour has a real effect on consumer choices, with 85 per cent of customers saying it's a factor in their purchases.



Saved colour schemes are rated by the Adobe Kuler community. You can search by popularity, find new schemes and look at random entries.



something about the nature and personality of your business. High contrast, warm colours like reds and yellows are seen as dynamic and vibrant. Cool colours are thought of as calming. The field of colour psychology is often fluff and vague, but marketing statistics blog Kissmetrics (bit.ly/11YDwR) has some interesting research on how people respond to colours when shopping.

If choosing colours that go well together is difficult for you – and even if it isn't – there are tools you can use to ease the process. We're going to look at two in depth. The first is Adobe's colour-mixer Kuler (<http://kuler.adobe.com>). It's one of Adobe's first free services, and is integrated into its professional production tools. The site combines algorithmic colour-picking technology with community features. Once you've created a colour scheme, you can make it accessible to other users. Indeed, if you don't trust your own colour judgement, Kuler gives you plenty of ready-made palettes, ranked and rated by visiting users.

USING KULER

The tool is very easy to use. Once you've signed up, click 'Create'. You'll see a long swatch of five colours across the screen. At the top and centre, there's a colour wheel with adjustable 'spokes'. Next to that is a list of colour rules. We've already discussed complementary and analogous schemes. The other options are variations on these, with the 'triad' algorithm being the main deviation, creating a scheme based on colours from three equidistant points on the wheel.

A good starting point is to enter a colour you're already using on your site as an RGB or HEX value, then choose a rule to apply. You can move points on the wheel to generate a scheme. When you're happy, give the scheme a title and description, then click 'Save'. The scheme is easy to use in web projects, because HEX values are generated for you to cut and paste.

COLORSCHEMER

ColorSchemer (www.colorschemer.com) is one of the web's oldest colour-mixing tools.

It was conceived as a free taster for a desktop program, ColorSchemer Studio 2. The online version is still powerful enough to create sitewide colour schemes. It's quite different from Kuler, but don't let the reduced feature set fool you into thinking it's not useful.

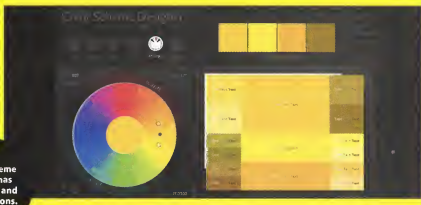
You can enter a base colour using RGB or HEX notation, or use the palette. The results are arranged as a 4 x 4 grid. ColorSchemer doesn't tell you how the grid is created, but each colour is shown adjacent to an analogous colour on the colour wheel. The base colour you picked is in the top left-hand corner. Look at the bottom right corner. That's the base colour's complementary partner – the hue opposite it on the colour wheel.

ColorSchemer uses an algorithm that generates a colour scheme from a base colour to its complementary partner, through fixed, analogous steps. Our advice would be to pick a column or a row and use that as your scheme. Either tool is a great start when picking a scheme for your site. [G118](#)

COLOUR SCHEME DESIGNER

Colour Scheme Designer 3 has the same, now familiar collection of algorithms to play with. The black background and colour wheel look familiar too. There are a couple of features that make it worth a try, though. The first is that you can try your colour scheme out in a dummy web layout, with a click of a link. The second is you can export colour schemes direct to CSS. Finally, Colour Scheme Designer also caters for colour-blind individuals.

Colour Scheme Designer has great looks and export options.





masterclass

STEP-BY-STEP TRAINING

IN THIS
SERIES

Get app-savvy and learn how to create — and sell — your own apps. Here, we cover the basics and the not-so-basic, from the equipment you'll need to practical steps to developing and getting approval for your apps.

Nokia: Friend for devs, or frenemy?

With falling sales figures and job slashing, Finnish giant Nokia turns to new technology — and Microsoft — to stay on track. It remains to be seen whether it's a viable option for developers

It was the news many Nokia enthusiasts had been dreading, but industry observers had been expecting: on February 11, the world's largest mobile phone maker took a dramatic change of tack by announcing it would base its future smartphone efforts not on its own Symbian operating system, but on Microsoft's emergent Windows Phone 7 (WP7) instead.

The announcement was the final nail in the coffin of Nokia's critically panned Symbian^3 operating system, which has failed to win multitudes of converts in the Android/iOS dominated smartphone market. The months since have seen chaos reign at the Finnish mobile giant, which axed 7,000 in April and outlined plans to outsource its 3,000 Symbian developers to Accenture. By May, the company

had cut its four-year-old Ovi brand in what many saw as a precursor to efforts to merge Nokia's Ovi Store with Microsoft's own Windows Phone Marketplace.

It's one of many steps in the marginalisation of the Nokia brand, which had so much momentum in the low- and mid-range market that it missed the turn to smartphones completely. Nokia has suffered sliding market share as it struggled to backtrack and make a compelling play in the ever more important smartphone arena: Gartner figures suggest Nokia's market share plunged from 30.6% in the first quarter of 2010 to just 25% early this year.

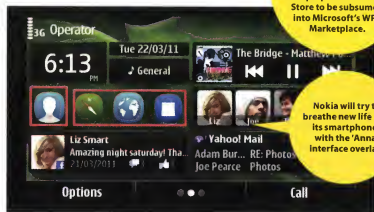
By next year, the release of Nokia-branded WP7 phones, backed by an as yet indeterminate range of blended services, will become the real test of how well the brand can survive. There are already

The new face of Nokia: Windows Phone 7's innovative interface has received many plaudits — but can Nokia differentiate itself with WP7 calling the shots?

The Maemo/MeeGo operating system on Nokia's N900 will appeal to tech-minded developers but remains a side project given its WP7 commitment.



● NOKIA OVI



Nokia's four-year-old Ovi brand has been a casualty of the company's reinvention as it prepares for its Ovi Store to be subsumed into Microsoft's WP7 Marketplace.

Nokia will try to breathe new life into its smartphones with the 'Anna' interface overlay.

Nokia's E6 and X7 will bow out later this year, representing some of the company's last Symbian-based smartphones.



THE CHALLENGE OF NOKIA IS GETTING USERS TO USE MORE THAN JUST THE BUILT-IN FEATURES OF THE PHONE. FOR THE COMPANY TO STEP UP IN THE MARKET, IT HAS TO CHANGE ITS APPROACH

rumours Microsoft is considering buying Nokia's phone business outright, although these were still unsubstantiated at press time.

Analysts have reacted positively to the move but warn there are still many questions to come. A report by analyst firm Ovum, for one, called it "a bold decision by Nokia but absolutely the right one... There were few short-term options available to the company to help get it back on terms with Apple and especially the Android masses."

IF MEEGO, WE GO TOO

Nokia's decision to move away from Symbian reflects a truth that many Nokia developers accepted a long time ago. "Symbian was never really meant for smartphones," says Dave Price, a Perth developer who was part of the three-man 'Light Hack Crew' that secured an international Nokia development prize last year for their work developing a 'light graffiti' application for Nokia's N900.

That device, which runs the fledgling Intel and Nokia-backed MeeGo operating system, proved to be a big step in the right direction – and for Price, it couldn't have come sooner. "The whole programming and development environment was just never really set up properly," he explains. "If you were pretty

hardcore you could get in there – but for a budding developer wanting to make apps, it was never really set up for that."

MeeGo, an open-source effort which combines the former Intel Moblin and Nokia Maemo projects, is built on a Linux core and offers far more customisability for developers. Nokia promotes its own Qt ('cute') framework and Qt Creator tool for developers wanting to build for MeeGo, but GTK+ development is also supported on the platform.

For Price, there's a lot to love about MeeGo. "We had nothing to do with Symbian, which was great," he says. "We had to learn the MeeGo platform and all the bits of hardware and the N900. It was a great challenge, but MeeGo is a completely open OS that's the opposite to Apple's iOS, where the development system is very closed and you only have access to certain hardware features. It's a different world and I love it: you're not limited by the silly rules [Apple] forces you to stick to."

While it offers much for developers to like, however, MeeGo may prove to be the smartphone OS only a mother could love. With a hugely constrained footprint already limiting its options on the best of days, Nokia's shift towards WP7 has left the platform in

limbo. "It's quite clear that Nokia's inability to bring MeeGo products to the market in the near term forced the company to partner with Microsoft," Ovum's report argues.

Nokia is planning to ship a MeeGo-based Nokia tablet before year's end, but developers can only take so much on faith – and even then, MeeGo will be a single platform running on a small number of devices from a single manufacturer. Given the wealth of alternatives in the marketplace, it's unlikely to be enough to convert many of the developers who have spent years building skills and experience for the Symbian platform.

Many of these will have a few more years of residual relevance as Nokia pushes out what it claims will be an additional 150 million Symbian-based phones in coming years. Yet the real question for developers is not how many phones will be shipped, but how many of those phones will be used in order to purchase real applications.

THE NOKIA CONUNDRUM

Herein lies a real issue for Nokia, whose user base mainly comprises either users of entry-level handsets or those upgrading from such handsets. This has direct implications on the types of usage models its customers pursue,

particularly when they upgrade to one of Nokia's smartphone efforts.

"The challenge with Nokia is getting users to use more than just the built-in features of the phone," says Nick Randolph, director of mobile-development consultancy Built To Room, whose credits include the Melbourne Coffee Review, one of the first Australian WP7 apps. "For the company to step up in the market, it has to change its approach."

Nokia's enterprise presence might make it one area of focus for developers – but if businesses aren't using extra apps and rely instead on built-in email and calendaring, there's little incentive for developers.

Darren Besgrove, director of mobile-enablement firm Blink Mobile, says these sorts of conundrums strengthen the case for developers to push towards cross-platform tools rather than committing to any particular platform.

"If you were an enterprise, there's no way in the world you'd try to standardise on the Nokia platform," he says. "They still outsell

everybody, but they are struggling with smartphones. If you were in the market for building standalone apps, I can see you would be standing there scratching your head and saying 'this is just too risk-prone.'"

To stave off defections by developers, Nokia has pushed its cross-platform Qt development tools as a grand unifier of sorts. Qt is a mature framework that supports major desktop platforms, embedded Linux, Windows CE and Windows Mobile, Symbian and MeeGo – and has, thanks to its open-sourcing by Nokia, also been ported to everything from OS/2 and Android to WebOS and even the Amazon Kindle DX.

Qt version 5 is reportedly due in 2012 and could, in theory at least, add WP7 support to the menu of supported environments, although Nokia has indicated this is unlikely to happen. Developers, however, will be better advised to explore the Microsoft ecosystem on Microsoft's terms: C#, Silverlight, Visual Studio and related development tools are all part of the package. Since Nokia is now

relying on WP7, there are still questions as to how much control it can exert over the WP7 environment: an overly prescriptive Microsoft will effectively make Qt irrelevant for volume-minded Nokia WP7 developers.

Indeed, Ovi has predicted the imminent demise of Qt as Symbian is phased out in the next few years. This will force developers to reskill themselves for WP7, or to switch to another platform entirely. In the first instance, the change may not be terribly onerous: Qt is built around C++ and should be relatively easy to move away from or adapt to a new platform, if necessary. Microsoft's experience in C++ integrated development environments, for example, is deep and extensive, which should minimise the transition to a more WP7-friendly platform if developers don't want to put all their bets on waiting for Qt 5.

THE WAY FORWARD

Given the uncertainty Nokia has injected into its strategy in the past year, many developers

INTERVIEW NOKIA ON NOKIA

Head of developer relations Kenny Mathers talks to APC about Windows Phone 7 opportunities.



Mathers sees "a very strong opportunity for Nokia plus WP7 to create that third ecosystem."

Singapore-based Nokia executive Kenny Mathers has been at the coalface throughout Nokia's recent changes, recently presenting at a two-day seminar at which he laid out Nokia's transition path to dozens of interested Australian developers.

And while he concedes there's work to be done, Mathers – Nokia's Asia-Pacific head of developer relations and marketing – is convinced it's worth it for developers to stick with Nokia for the long haul. We asked him about the future of Nokia and the company's new direction.

APC: What's the best timeframe for developers to start building WP7 apps?

MATHERS: We've been clear in saying that WP7 will be our primary smartphone platforms and we expect to ship our first Windows phone device in 2012. For some developers that will represent an opportunity: some developers' business model is to be a technology first mover, and they'll want to get in on the ground floor.

APC: But what about developers who need to make a living?

MATHERS: For the majority of developers interested in monetisation in the short to medium term – the next six to 18 months – our message is that they need to continue to invest in Symbian. Within a market like Australia, which is very smartphone driven, the opportunities still continue for Symbian.

APC: What kind of devices should they be planning on building for?

MATHERS: We plan to ship an additional 150 million Symbian devices, and as a platform we'll continue to reach lower and lower price points. In the second half of this year we plan to ship about six different Symbian device models into the market, with the enterprise-focused, fixed QWERTY keyboard E6 and tablet devices like the X7. In order to do this, we'll continue to invest in Symbian. We'll be able to bring WP7 devices to the market at the price points only Nokia, with its price points

will invariably choose to suspend their Nokia work and plan out a migration path towards the well-regarded but still-evolving WP7 platform.

David Keane is one of them. As CEO of discount mobile calls provider BigTinCan, Keane has been evaluating smartphone platforms and long ago decided Nokia's strategy was still too unclear, and its market share too insignificant, to merit the resources necessary to build a Symbian client application; instead, the company supports iOS, Android, Windows Mobile and Research In Motion's BlackBerry OS.

"We never did a Symbian client because we didn't think many Nokia customers were going to pay for the service," Keane explains. "The hardware and operating system don't really provide a positive experience that makes people think they're going to get value for money when buying an app; the other platforms provide real value for people."

Still, he's upbeat about the potential for a strong joint offering from Nokia and

Microsoft: "I think WP7 is going to be a good platform for businesses and consumers," he offers. "It's going to be a huge call [for Nokia] as they'll be fighting with HTC and other WP7 OEMs. But for the developer it's great: as a small company you've only got limited resources and have to do a few things well rather than doing everything. This partnership has taken out the need to develop for another platform that wasn't really delivering a lot of return."

That's a harsh but ultimately common appraisal of Nokia's way forward. MeeGo remains an unknown quantity with its potential for an entry into the tablet market, with some observers arguing that it's still early days for tablet competitors. However, even this potential isn't going to be enough, single-handedly, to stem the likely tide of defections from the Nokia platform. "The market is not waiting, and customers are not waiting," says Keane.

Ovum analyst Adam Leach believes that Nokia has until Q4 of this year – when

millions of smartphone buyers will evaluate alternatives to iPhone and Android-based devices – to release shipping WP7 product in order to remain relevant.

Given that Nokia certainly feels the pressure to deliver; existing developers may find enough to hold on to in Nokia's strategic announcements.

However, it's still prudent to be building WP7 skills – or jumping on the higher-volume Android or iOS bandwagons – in the short term. And with so much up in the air, there simply isn't much to attract new developers to a pair of platforms that for now are simply waiting out the clock.

"If you're not an existing developer, it's not a good time to enter the Symbian market," says Leach. "But the commitment to WP7 is likely to have a positive impact for Nokia and its developers. Nokia was finding it difficult to attract developers to the Symbian platform; however, with the help of Microsoft it's more likely to succeed in attracting developers."

and supply infrastructure, can do. And that will attract developers to the platform.

APC: What will happen to the Ovi Store when Nokia merges its interests into WP7?

MATHERS: Our main differentiator is that in addition to offering credit card billing, we have offered the ability to sell apps via operator billing [so apps show up on customers' telco bills]. We're up to 112 operators globally offering operator billing and have 160 developers who have crossed the million-download threshold.

We're at well over 5 million downloads a day globally, and with the Ovi Store available in more than 190 countries, 90% of people consuming content are able to do so in their own language. So we will be contributing to the WP7 ecosystem our operator agreements and language support, and Nokia [Ovi] Maps, and developers that had distribution arrangement in place will still continue to be available in the WP7 Marketplace.

We'll make it easy for developers to learn how to build on these and we're communicating with developers to be as transparent as possible so they can make a decision when would be a good time to enter the WP7 ecosystem. We want to be in a position such that when the first Nokia WP7 devices come out, consumers using existing Symbian devices will find that all their favourite apps are available on WP7.

APC: Nokia will be just one of many smartphone vendors building WP7 phones. How will you differentiate your devices?

MATHERS: We do have opportunities to differentiate, but we won't be fragmenting the WP7 platform and we'll make choices to prioritise the success of the ecosystem first over trying to differentiate. We're contributing our billing relationships, the Nokia [Ovi] Maps service, and more to the ecosystem. And that means developers

framework for MeeGo, so when we launch a MeeGo device later this year, developers who have built their Qt apps will have them work in MeeGo as well.

But we've made the decision not to port Qt to WP7; it was our decision to put the ecosystem and platform first over Nokia's priorities. So Qt will not come to WP7, but we'll continue to make massive investments in it and it continues to be popular. There'll be future investments in mobile around Qt, which we'll announce later this year.



DEVELOPERS AND CONSUMERS ARE EXCITED ABOUT THE USER EXPERIENCE WP7 DELIVERS

also choosing to distribute through Samsung, HTC or any of the other device manufacturers will be able to do that; every partner within that ecosystem is going to benefit from this.

APC: How much relevance will Qt have in the WP7 world?

MATHERS: The beauty of Qt is that it's a framework that exists on around 150 million Symbian devices today, and will continue to exist. It's also the development

APC: You're really testing the allegiance of Nokia developers. How hard has it been to turn this ship around?

MATHERS: We've had extensive feedback from developers, and there have certainly been questions and frustrations. But overall, the feedback has been that they understand. Developers and consumers are excited about the user experience WP7 delivers, and the ones I've spoken to see there's a very strong opportunity for Nokia plus WP7 to create that third ecosystem.  



games

HIGH-PERFORMANCE PLAYTIME

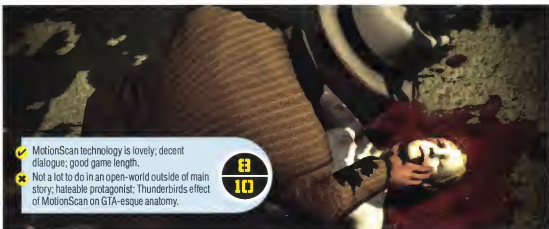


PS3 update

PSN AND MOVE SHARPSHOOTER

So with the PlayStation being more or less inoperable over the last few weeks (at the time of writing) due to some ... unforeseen circumstances, we have decided to hold off on reviewing anything for the PS3 until the problem is rectified and we can give the online features of games the respect they deserve.

Needless to say, the 'need to play' pile is steadily growing. While time ties quickly in gaming and the relevance of reviews comes into question the older a game gets, we will always run reviews of great games. In the meantime, feast your eyes in what is probably the best Assault Rifle peripheral for PS Move you've seen today (above). The unit is solid as a rock and feels great in the hands. The front section has a sweet cocking action that can be mapped to pretty much any function and all the appropriate control buttons are well within comfortable reach. A lot of awesome for \$80.



- ✓ MotionScan technology is lovely; decent dialogue; good game length.
- ✗ Not a lot to do in an open-world outside of main story; hateable protagonist; Thunderbirds effect of MotionScan on GTA-esque anatomy.



L.A. Noire

How can I help Detective?

Rockstar Games

www.rockstargames.com/lanoire

\$108



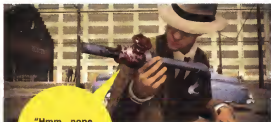
L.A. Noire (LAN), from local developers Team Bondi, thrusts players into the role of Cole Phelps, an ex WWII Officer turned policeman in the seedy city Los Angeles; the city is in a post-war boom – drugs, murder and arson are at an all-time high as is corruption amid the ranks of those who 'serve and protect'. The game plays out through segments of Cole's career as he rises through the ranks from beat-cop to homicide, vice and finally arson investigation. There are 21 cases to solve most of which are separate incidents bound within the main story of Cole's military history and motivations. The overall game play feels like a mash-up of Mafia II's semi-open-world with Heavy Rain's slow and methodical scripted action.

LAN is an investigative adventure and it's pretty safe to assume that everyone in the 40's is a thief, murderer and a liar so most of a player's time will be taken up scouring crime locations for clues (ligature marks, bloodied clothes and muddy boots are located with a gentle rumble in the controller) and interviewing suspects to try and get a confession. Interviews are where the power of the MotionScan tech shines and the gameplay becomes a little stale and predictable.

Questioning flows from threaded dialogue with three possible outcomes (truth, doubt and lie) generally with only one correct response. Getting the right answer means unlocking clues to further the investigation or even a straight confession. Watching the characters faces for signs of deception is the key to progression; tics, twitches and general discomfort is a sure sign that they're not telling the truth and further probing is needed, though you'd better have a smoking gun if accusing anyone of lying.

While the game ships with three game discs, there's only about 25 hours or so of actual mission based gameplay to be had (depending on how much driving or laffing about the player get up to) with an extremely light sprinkling of side-objectives available. Unlike the other open-world Rockstar titles where chaos, random gunplay and explosions rein, side play is limited by a lack of content and Cole's station as an officer of the law.

LAN is more of a MotionScan showcase with gaming elements rather than a game with some kick-arse tech behind it. The entire Noire affair at its base level is a blend of GTA/Mafia II action with MoCap expressions sans side-missions, style and spontaneity. In fact, the ultra realistic facial expressions on Mafia II bodies gave us the creeps in a too-real Uncanny Valley way. The Thunderbirds did the same with superior facials to puppet-bodied walking. It's a shame that players are pushed through the main campaign too quickly; it doesn't lend itself to any real exploration of the huge, vibrant city. All-in-all, it's a game of missed opportunities and polish deficiencies; even the Noire genre is loosely / poorly handled with the only recognisable hallmark being the fact it's a police story set in the 40's.



"Hmm... nope, nothing relevant here."

Brink

One part Call of Duty: Black Ops, one part Mirror's Edge...

Splash Damage www.splashdamage.com/ \$88 PC, \$108 consoles

I've been intrigued by Brink since I first heard of it. It promised an incredible blend of the fast paced action of Call of Duty: Black Ops and the free running of Mirror's Edge. Having played the finished product, I've got mostly positive feelings.

Brink takes place in the future on a floating city called the Ark. A disaster caused sea levels to rise, and the Ark was swamped by refugees. Now unstable due to overpopulation, Ark Security fights to maintain order against the Resistance who want to escape the increasingly dilapidated Ark.

When you start Brink you design a character from a huge range of options, and although you're encouraged to play the informative tutorials you can immediately jump online or play the single player campaign with slightly ineffective bots for teammates. The game's unique art style looks brilliant, and combat is exhilarating due to the SMART (Smooth Movement Across Random Terrain) system that lets you seamlessly vault over obstacles, climb walls and so on; it feels like an exciting action movie, but not all characters move the same. Lights have full SMART movement, low health and light weapons, Heavies lumber gracelessly around, take a beating and heft big guns, while Mediums are in between.

Multplayer has eight maps that can be played as a cooperative campaign or against other players, in order or individually. Attackers attack, defenders defend, and each side has opposing objectives that are selected via an intuitive circular interface that's

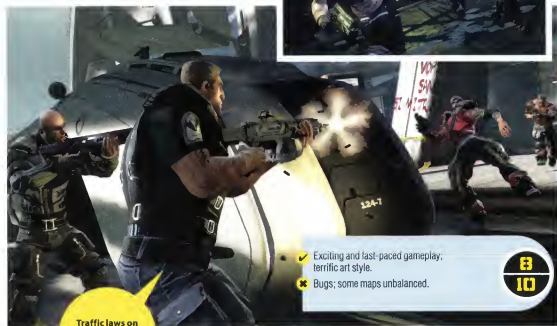
also used to change class, a necessity as some objectives are class-specific. Some maps do heavily favour defenders, which leads to some practically unwinnable situations.

The class system adds lots of depth. Soldiers fight hard, Medics heal the team, Operatives sneak around and sabotage things while Engineers build stuff. Abilities (and clothing) are unlocked via an experience based levelling system that reward doing just about anything, and there's a vast array of options.

There are a number of bugs though, and I encountered the sound switching off as well as all enemies becoming invisible. To Splash Damage's credit they've been fixing problems, but many should not have passed beta testing.

Brink is a slightly flawed but essentially good game. When it works, it's a really enthralling experience. Come across bugs, connection problems or an unbalanced map and frustration quickly sets in. It's worth persevering through the frustration, because Brink will reward that patience with more exhilarating fun.

Conrad Bem



Traffic laws on the Ark are taken very seriously.

- ✓ Exciting and fast-paced gameplay; terrific art style.
- ✗ Bugs; some maps unbalanced.

8
10



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GAME
ON



Topfive

Non-violent games that even your grandma would like... when she's not playing CoD that is....

01 WORLD OF GOO

Excellent puzzling; create teetering structures of Goo to reach a given goal in each level.

02 BEAUTIFUL KATAMARI

Round up random objects into a Katamari (ball) and roll them around to satisfy the King of All Cosmos.

03 ANIMAL CROSSING

Make friends, decorate your house and shake trees. A furries dream come true.

04 PEGGLE

Peg clearing fun.

05 FLOWER

Control the wind as it carries a flower petal(s) on a journey. Beautiful. (If you weren't violent before playing this one, you will be after! - Dep Ed)





3DS

DEAD OR
ALIVE:
DIMENSIONS

● \$68
● www.gamecity.jp/no/doad/
Well, the launch glow of the 3DS is fading and now we sit and wait for the great games announced at launch to be released. There's only so much Street Fighter we can play, and Ridge Racer only went so far in filling the off times. So Team Ninja's *Dead or Alive: Dimensions* is a very welcome addition to the compact library of decent titles under the 3DS banner. *Dimensions* is a fast-paced fighting game in contrast to the stylings of *Street Fighter*. Where the latter utilises complex button and stick controls for success, *Dimensions* offers combat reversal, counter-attacks and genuine tactics to win out. The more time a player sinks into the game to understand its combat nuances, the more they'll get out of it. Be sure to switch on your Street Pass!



PREVIEW

Deus Ex: Human Revolution

Square Enix www.deusex.com
\$78 PC, \$108 consoles

Late last year we were invited to a media briefing of *Deus Ex: Human Revolution* (HR) where we were gobsmacked by the opening sequence of the game as well as a small sampling of the missions in and around the Detroit police station. And then came the release delays. We finally just got our hands on preview code of HR that featured the intro sequences and early missions of the game.

For anyone new to the title, HR is a plot driven action title set in the year 2027 (25 years prior to the events of *Deus Ex*) dealing with the theme of Transhumanism and the ethics of human improvement through technological 'upgrades', or augmentations (bionic limbs, eyes etc.). Players assume the role of Adam Jensen, a 'natural' security officer for Sarif Industries who, after being severely injured during an attack on the company, undergoes extensive augmentation surgery to save his life. Adam, now heavily augmented, wakes to take up his position as head of security while dealing with the ethical ramifications of being augmented and tracking down those responsible for the attack.

The game looks and plays beautifully; the level of detail in the environments coupled with rich, masterfully delivered dialogue and storytelling add to the overall believability of the plot. The game is mission based with RPG elements and played out in an open-world environment absolutely ripe for exploration. In fact it's encouraged. Most of the missions can be approached from several vantage points and plays to the strengths of Jensen's augmentation upgrades; gaining experience 'levels' grants Jensen an upgrade point that can be used to improve skills such as speech, hacking, strength, defence and stealth. As with the *Fallouts* of the world, focusing on hacking and speech skills felt like the path of least resistance but the hard-line strength approach is still available for those with a penchant for getting busy with weapons. While it's still a little while away from retail (at the time of writing), HR is shaping up to be one of the better titles for 2011 and a must play. Stay tuned for a full review.

Fight Night:
Champion

Punch drunk and ready for action.

● EA www.ea.com/fight-night ● \$108

EA's long running boxing series is finally hitting it's stride ... or punch ... or whatever they say in boxing circles. Players are likely to spend most of their *Fight Night Champion* gaming beating down opponents in the champion mode (story mode), which brings a new twist to competitive boxing games ... a story. Players take on the role of Andre Bishop, a professional boxer who finds himself shafted by the rusty shiv called corruption, to wind up in jail. After serving his time, Andre returns to boxing arenas and seeks payback on those responsible as well as becoming the heavyweight world champion. The championship mode plays out a little differently than normal; there is a slightly adjusted rule set and play style to help carry through the plot. For example players may need to beat an opponent in a certain manner to progress, or avoid using certain punches to avoid permanently damaging an injured hand. It's a refreshing, and welcome change to the series.

The control scheme of the *Fight Night* games is somewhat of a sticking point for many of the diehard fans; while we loved the full analogue controls of *Fight Night 4*, it was retro patched back to the original button press clicking of the previous chapters. *Champion* once again reintroduces – much simplified – analogue controls where throwing a punch is as simple as flicking the right stick.

While fans of the *Fight Night* series won't be in for any surprises in regard to fight mechanics, what they can expect is the most polished title of the series, which manages to inject heart, soul and passion into what was otherwise little more than 'going-through-the-motions' gaming.

The online aspects of *fight Night* have been vastly improved as well. Players create a boxer with base stats and then take them to the ring. Experience points are earned for every fight participated in which in turn incrementally improves a boxers skills. Online gyms can be made – the boxing equivalent of guilds – for players to band together, train and then challenge other gyms.



✓ Champion (story) mode is great; nice control scheme.

✗ Legacy mode is stale.

E
10



Storm in a teacup

Platform gaming doesn't get much cuter.

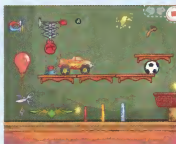
bit.ly/in4aDF iOS

We would have thought that after the success of their Angry Birds, the guys over at Chillingo would have retired somewhere tropical to sip beverages with fruit on the rim of the glass. Instead they have been beaver away at yet another ridiculously cute, highly playable piece of iOS addiction. Playing as Storm, literally in a teacup, players explore levels created by their brother cloud. Platforming is the name of the game so expect to be jumping, collecting and beating down opponents with the simple goal of getting to end of the levels. There're a full compliment of achievements ripe for collecting as well as a hidden lightning bolt on every level. Replayable.

R-Type Classic

bit.ly/bqP4Kp
iOS

Classic games never go out of fashion, they only get remade. And there-in lies the problem; the long-loved title isn't always treated with the respect it deserves and often times comes out looking like dropped eggs. Thankfully (as long as you don't use the tilt controls) that can't be said for this classic 80's side-scrolling shooter that is as hard today as it was when it was 20c a go. Unforgiving yet rewarding; they don't make shooters like this anymore.



CASEY'S CONTRAPTIONS

Simple simply isn't worth it

bit.ly/m9YIRI
iOS

Rube Goldberg machines are all the rage. There's an absolute over-saturation of wacky over-engineered contraptions achieving the most menial of tasks on YouTube for a simple reason; they're awesome. Casey's is a healthy little game where players are asked to create machines of their own in order to solve a series of puzzles. There is some fantastic Game Centre functionality as well as the ability to challenge your friends via email. Good clean fun.

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BY SIMON CHESTER



iOS-CONTROLLED ROBOT LAWNMOWER

You know, the worst thing about living in 2011 is that it doesn't seem like 2011. We all thought we'd be jetting around in our flying cars and taking holidays on the moon while our robot slaves did all the stuff we never wanted to do.

Well, I guess one outta three ain't bad. We all know about the Roomba (that cute little vacuum cleaner robot that Kittens love to ride on), but now there's a much more manly version available from Husqvarna that gets geek points for a) mowing your lawn

for you, and b) being able to be monitored, controlled and diagnosed via the My Automower app for iOS.

You can plot a course out for it on Google Maps, or you can watch where it's going in real-time.

The Automower will head back to its station to recharge when it runs outta juice, and will send you a text message if it runs into trouble. Now, hands up who wants to hack this thing to go down to the store for beer?

Schizophrenic computer claims terrorist attack

OK, so the headline here is maybe just a little too sensationalist, but researchers at the University of Texas in Austin and Yale University have programmed a computer-powered neural network with a possible form of schizophrenia.

A neural network is a program that's able to learn roughly the way a human brain does: from experience. The more it experiences, the more it learns. The idea behind the research was to recreate in the computer the 'hyperlearning hypothesis', by having it treat everything as extremely important.

This hypothesis suggests that some schizophrenia is caused by the brain marking all memories as important, due to excessive levels of dopamine. The brain then stops forgetting or ignoring as much as it normally would, and causes the patient to make illogical connections and paranoid jumps in reason.

Interestingly enough, the computer did just that, going beyond just spewing out nonsensicals, and ending up claiming responsibility for a terrorist attack. What does this prove? That Osama wasn't killed, but actually uploaded himself to the cloud, Lawnmower Man style, of course.



Teeny Atari-compatible microSD drive

There's a soft spot for retro computing in every geek's heart, but, these days, where can you buy the 5.25in floppies, the tapes, or any of the other plethora of media that has existed throughout the years?

Faced with this problem, many retro computer geeks take it upon themselves to modify modern media (like SD cards etc) to work with their digital museum pieces. But there's something off-putting about a 21st century card reader jutting out of your 20th century collector's piece.

And so was born the miniaturised Atari 810 microSD disk drive. In fact, this diminutive piece of style is actually an Atari connector paired with an LPC1114 microcontroller, capable of emulating up to eight Atari drives, and is managed by a custom auto-booting app.

The enclosure was created through the wonders of 3D printing, and won't be produced in number. However, if you happen to have a spare 3D printer lying around, and a hankering for a new retro microSD card reader, the schematics for the whole project are available at bit.ly/mv1J85

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- PC Buyer's Guide



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MYOB AccountRight Plus 19

- Bill for your time, down to the last minute
- Easy inventory management
- Manage employee payroll
- Efficiently process your accounting and BAS requirements

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MYOB AccountRight Plus 19

- Bill for your time, down to the last minute
- Easy inventory management
- Manage employee payroll
- Efficiently process your accounting and BAS requirements



\$1497 MY90110 **Save \$352**

MYOB AccountRight Premier v19

- Multi-user access
- Operate in multiple currencies
- Manage employee payroll
- Bill for your time, down to the last minute
- Stay AOK with the ATO
- Know your business bottom line
- Easy inventory management

\$369 MY90107 **Save \$60**

MYOB AccountRight Standard 19

- Manage jobs, customers and suppliers
- Easy inventory management
- Business Insights Dashboard included



\$15 MY90095

MYOB Student Version

MYOB Student Edition software is the ideal way for students to practice course curriculum taught at schools, TAFE, Higher Education and Private Training Institutions at their own pace.



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- Better manage your jobs and customers

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- Invoice, pay bills and track expenses
- Track inventory, GST & lodge BAS online

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- Create and share information with each other through a network
- Drag and drop Excel spreadsheets
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FileMaker



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MSA5134

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MSA5135

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MSA5128

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Dragon

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- Move, resize, copy and delete images
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- Send to Evernote and email
- Add, delete, reorder and rotate pages

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- Turn talk into text
- Unlock your creativity
- Work comfortably
- Multi-task like never before



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Nuance

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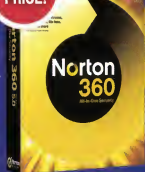
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- Batch convert your documents

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AVG0009



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Norton Ghost 15

- Restore your computer from system failures even when you cannot restart
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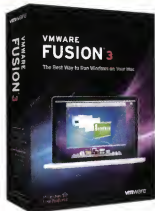
Save \$10

Acronis True Image Home 2011

- Fast & easy backup and recovery
- Acronis online backup to a secure location



MAH0188



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VMware Fusion 3

- Run Windows and Mac OS X side-by-side
- Drag-and-drop your files between operating systems
- Multiple-display full screen view with much better performance

\$88 Save \$22

Parallels Desktop 6

- Run Windows within Mac OS X
- No need to reboot when switching OS



\$133 Save \$27

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- Share on DVD, portable devices, YouTube & Facebook
- NEW! Edit & create in 3D



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- Edit High Definition Blu-ray discs



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Upgrade (COR9226) **\$198**

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COR9222

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Photoshop	•				
Illustrator			•	•	•
InDesign CS5.5			•	•	•
Acrobat X Pro	•				•
Flash Catalyst					•
Flash Professional CS5.5					•
Flash Builder 4.5					•
Dreamweaver CS5.5					•
Fireworks CS5.5					•
Contribute CS5.5					•
Premiere Pro CS5.5				•	•
After Effects CS5.5				•	•
Soundbooth				•	•
OnLocation CS5.5				•	•
Encore CS5.5				•	•

Student & Teacher	\$268	\$327	\$327	\$327	\$492
WebCode - WIN	ADA0033	ADA0031	ADA0035	ADA0039	ADA0037
WebCode - MAC	ADA0032	ADA0030	ADA0034	ADA0038	ADA0036
Academic	\$598	\$797	\$797	\$797	\$1,328
WebCode - WIN	ADA0053	ADA0051	ADA0055	ADA0059	ADA0057
WebCode - MAC	ADA0052	ADA0050	ADA0054	ADA0058	ADA0056
Upgrade	\$712	\$924	\$924	\$924	\$1,352
WebCode - WIN	ADC0027	ADC0086	ADC0096	ADC0049	ADC0039
WebCode - MAC	ADC0022	ADC0087	ADC0097	ADC0044	ADC0034
Full	\$1,850	\$2,704	\$2,561	\$2,419	\$3,699
WebCode - WIN	ADC0026	ADC0092	ADC0096	ADC0048	ADC0038
WebCode - MAC	ADC0021	ADC0093	ADC0099	ADC0043	ADC0033

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Adobe Photoshop Lightroom 3

- All the tools to keep your digital projects creative and organized
- Batch conversion for those big projects
- Create incredible images that move your audience
- Showcase your work in elegant print layouts, slide shows, and web galleries
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Student & Teacher WIN/MAC	ADS5026	\$115	SAVE \$5
Upgrade WIN/MAC	ADU5079	\$144	SAVE \$6
Educational WIN/MAC	ADE5039	\$129	SAVE \$11
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Educational WIN	ADE5028	\$361	SAVE \$89
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\$569 ADC0060 **Save \$100**

Adobe Dreamweaver CS5.5 - Windows

- Develop pages with content management systems
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Education (ADA0062) \$266

Student (ADA0041) \$123



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\$847 ADC0026 **Save \$158**

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- Publish with precision and power using sophisticated drawing tools
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Education (ADE5024) \$272

Upgrade (ADU5035) \$285



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Adobe InDesign CS5.5 - Windows

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Upgrade (ADC0084) \$285



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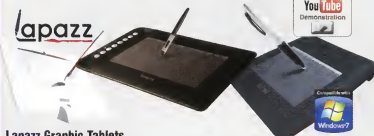
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WAC6400



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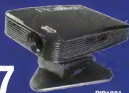
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- PC & MAC Compatible



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- 4000 Max Lumens
- 16:10 Widescreen
- 2x VGA, HDMI, Composite, S-Video Inputs
- Operate and monitor through Ethernet & Wireless
- Low power consumption

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Acer V193HQBD 18.5" LED Monitor

- 1366x768 Resolution
- 5ms Response Time
- 5,000:1 Contrast Ratio
- VGA, DVI with HDCP



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- 1920 x 1080 Resolution
- 2ms Response Time
- 40,000:1 Contrast Ratio
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BenQ M2700HD 27" LCD Monitor

- 1920 x 1080 Resolution
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- Intel Core i3-550 3.20 GHz
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- Super Multi DVD Rewriter
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- Logitech Deluxe 250 USB Desktop



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ACM0170

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- 1920x1080 Resolution
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ACM0166

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- 1920x1080 Resolution
- 2ms Response Time
- 12,000,000:1 Contrast Ratio
- DVI, VGA, HDMI Connectivity
- 21mm Thick



ACM0168

\$1052

WBX0009

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- nVidia GT210 1GB Dedicated Graphics
- Super Multi DVD Rewriter
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- iLuv iPad Keyboard & Case (ILU0001) **\$128 SAVE \$21**

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Connects to the Internet via Wi-Fi and over 3G cellular networks while you're on the go.

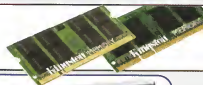
- 16GB Black (APP5011) **\$729**
- 16GB White (APP5012) **\$729**
- 32GB Black (APP5013) **\$839**
- 32GB White (APP5014) **\$839**
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- Intel Atom N455 1.66GHz
- 1GB RAM
- 250GB Hard Drive
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- Windows 7 Starter



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- nVidia T250 Dual-Core 1GHz Processor
- 1GB RAM



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- 1GB Dedicated Graphics
- Windows 7 Home Premium



\$1187 MS0051 **Save \$112**

MSI GE620 Core i7 Notebook

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- 4GB DDR3 RAM
- 500GB SATA Hard Drive
- Windows 7 Home Premium



\$457 TOS0154 **Save \$120**

Toshiba Satellite Pro C650 Notebook

- Intel Core 2 Duo T6670 2.20GHz
- 2GB DDR3 RAM
- 500GB SATA Hard Drive
- Windows 7 Home Premium



\$598 SUN1003 **Save \$201**

Acer TravelMate 5742 Notebook

- Intel Core i3-380M 2.53GHz
- 2GB DDR3 RAM
- 320GB SATA hard drive
- Built-In webcam
- Windows 7 Home Premium 64-Bit



\$843 TOS0155 **Save \$106**

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- 4GB DDR3 RAM
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\$848 ACE0106 **Save \$351**

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- Windows 7 Home Premium



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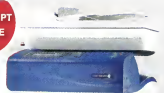
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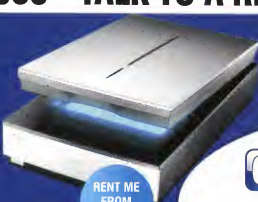
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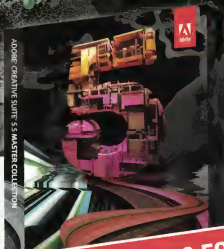
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